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1. Papers that contain original thinking in education or educational research.
2. Papers that make a significant contribution towards developing a theory.
3. Papers that summarize and discuss an outstanding study or a piece of educational research.
4. Papers that review significant research in important areas.
5. Letters to the Editor on important research problems.

The emphasis is on categories 2, 3, 4 and 5. Ordinarily, a paper is not accepted if it has appeared in print or in any form elsewhere. Exceptions may be made for contributions which the General Editor considers

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Effectiveness of Microteaching in Teacher-Training

A Study

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The Department of Teacher Education, NCERT undertook in July 1975, a field experiment in collaboration with the Centre of Advanced Study in Education (CASE), M. S. University, Baroda. Nine colleges of education/departments of education collaborated. The main objectives of the experiment were to study the effectiveness of microteaching as a technique of training teachers and to try out different variations of microteaching components so as to determine their relative effectiveness.

This paper presents results of the field experiment which is first of its kind in the area of microteaching. It is hoped that the results of the study would prove of value to the teacher-education institutions in the country.

January 1978

BACKGROUND OF THE PROBLEM

THE present-day teacher-training programmes are frequently being criticized for their ineffectiveness in preparing effective classroom teachers. Various education commissions and committees have pointed out loopholes in them and have suggested improved measures. Trainees give lessons on Herbartian steps which are either not supervised or ill-supervised as Education Commission (1966) puts it. As found in the Second National Survey of Secondary Teacher Education (Pandey, 1969), the number of lessons varied from 10 to 40. Further, the survey revealed that the number of supervisors of practice teaching lessons varied from 4 to 45.

Evaluating the practice teaching programmes in India, Srivastava (1970) has observed that there was no consensus regarding the total time spent on practice teaching. The majority of the student-teachers had developed unfavourable attitudes towards the practice teaching. As pointed out by Mehrotra (1974), the present practice teaching was ineffective due to the defect in the supervisory system where an atmosphere of tension had artificially prevailed and lack of clarity about supervisory role existed. This may be due to lack of clarity and consensus regarding the model towards which the trainees should progress. Generally, the supervisory remarks will be so global that the trainees find it difficult to incorporate in subsequent lessons. Hence, there is a need to improve our practice teaching programme. Among various innovative approaches, microteaching technique has been widely tried out and in some of the institutions in India, like the Centre of Advanced Study in Education, Baroda, Government College of Education, Ratnagiri, etc. it has been implemented also.

The microteaching technique may be considered as a miniaturized classroom teaching. The following are the steps generally followed while employing this technique :

- (i) A student-teacher teaches a small class of 5 to 10 pupils, may be real pupils or peers acting as pupils, for 5 to 10 minutes. The content of the lesson is generally a single concept. A lesson is observed either by a supervisor or peer supervisor using a specially developed evaluation proforma for the skill or it may be recorded on an audio-tape/video-tape for the latter evaluation. This session is known as teach session.
- (ii) After the teach session, the trainee is given the feedback. He along with the supervisor or peer supervisor goes out to a different

room to discuss the lesson. This may be termed as a critique/feedback session.

- (iii) During this session the trainee goes to another room where he re-plans his lesson in the light of feedback/critique he received. This session is known as re-plan session.
- (iv) This session is a re-teach session where the trainee teaches the same or different unit to a different or same set of pupils.
- (v) After the re-teach session, there is a re-feedback/re-critique session.

All the sessions may go together as one microteaching cycle. This cycle may continue till the trainee attains a pre-tested mastery level in that particular skill. Instead of global training in the whole process of teaching, microteaching as a training technique helps the teacher-educators to train student-teachers for a number of teaching skills at a time under controlled conditions.

In microteaching, the trainee focusses his specific, well-defined teaching skills, one at a time. And in behavioural terms, they can be objectively observed, controlled, measured and practised. Since what to train for is behaviourally defined, the feedback given by the supervisor will be pinpointed and hence the trainee can easily incorporate them. This has not been possible in the present-day teacher-training programmes. However, there will be little disagreement between the trainee and the supervisor. The technique provides for feedback and since the lesson is of a shorter duration the trainee can easily recollect his performance. Since he will be immediately re-planning and re-teaching, the scope for improvement will be more. The technique provides a safe practice ground. Safety can be from two points of view: Firstly, the trainee will have less problems of classroom discipline and hence less tension which is one of the desirable conditions for the trainee who is learning to teach. There will be less tension because the trainee focusses on the specific aspect of teaching and he need not have to practise all aspects of teaching at a time. Secondly, it is safer from the pupils' point of view as they need not have to suffer under the new teacher. Many of the administrative problems in arranging lessons may be reduced, as microteaching can be implemented where student-teachers can themselves act as pupils. It also allows student-teachers to act as supervisors. Of course, it needs to be decided whether peers can give effective feedback or not. Finally, the technique provides opportunities for undertaking research studies under controlled conditions.

In view of the advantages of microteaching as briefly described above and the optimism microteaching as a training technique provides, one finds

the need to explore an experiment with this technique to study its applicability and effectiveness in the teacher-training.

REVIEW OF RESEARCH IN INDIA

Most of the studies in microteaching conducted in India show that microteaching is feasible and an effective technique in training of teachers. Chudasama (1971) found that microteaching was more effective than the traditional technique in the development of indirect teacher behaviour. Passi and Shah (1974) found that microteaching was effective in developing the skills of questioning, reinforcement, silence and non-verbal cues, and illustration and use of examples. They found the technique feasible, and the student-teachers had developed favourable attitude towards the technique. According to Marker (1972), microteaching was a better technique than conventional approach in the development of certain teaching skills, namely, reinforcement, and silence and non-verbal cues. Singh (1974) showed that microteaching was a more effective technique as compared to interaction analysis and conventional approaches regarding modification of teacher behaviour. Bhattacharya (1974) tried microteaching with polytechnic teachers and found it more effective than conventional technique in the development of indirect teacher behaviour. Vaze (1976) found that audio-modelling was a better technique as compared to symbolic models for the skill in questioning. The doctoral studies of Passi (1976), Lalitha (1976), and Joshi (1976) at the CASE have produced useful instructional materials for the development of teaching skills. These materials have been tried and are available in *Becoming Better Teacher—Microteaching Approach* (Passi, 1976).

Although the studies reviewed above are encouraging regarding the effectiveness of microteaching technique, such studies have been sporadic and lack comprehensiveness to arrive at any generalization. Further, there is no study completed yet which has compared the effectiveness of this technique with the traditional approach as regards the development of general teaching competence. Hence, there is a need to undertake studies at national level which are more comprehensive and systematic to find out the comparative effectiveness of microteaching and traditional approach to teacher-training in developing general teaching competence. To fulfil this need, the present study has been undertaken.

The Problem

The problem reads as : A study of the relative effectiveness of micro

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teaching and traditional technique of teacher-training in the development of general teaching competence.

Objectives

The general objectives of the study are :

1. To compare the effectiveness of the microteaching technique with the traditional method in the development of general teaching competence.
2. To try out microteaching technique with different variations so as to determine the differential effectiveness of various treatments in the development of general teaching competence.

Hypotheses

1. The General Teaching Competence (GTC) scores of student-teachers taught through Standard Microteaching Technique (SMT) will be higher than the student-teachers taught under Traditional Technique (TT) of teacher-training.
2. The GTC scores of student-teachers taught through Modified Microteaching Technique (MMT) will be higher than the student-teachers taught under TT.
3. The GTC scores of student-teachers taught through SMT and MMT will be equal.

Delimitation

1. The study is delimited to only those colleges of education which run B.Ed. courses and are located in the urban setting.
2. Both male and female student-teachers were taken as the subjects for study.
3. The experiment was restricted to only five teaching skills—probing questions, stimulus variation, reinforcement, explaining, and illustrating.
4. The lessons as per SMT procedure were given under simulated conditions by the pupil-teachers.

Method and Procedure

In order to meet the objectives mentioned above, a group of similar experimental studies were undertaken simultaneously by teacher-education institutions from different parts of the country. All the institutions included in the study followed parallel group experimental design. The participating staff members representing these institutions were given orientation and training regarding the sub-experiments to be carried out in the respective institutions under the major study in two workshops of four days each. The design of the experiment was same in all the institutions. The treatments were standardized and kept uniform except for the deliberate variation brought out in one of the experimental groups. These studies under the major design were so undertaken so as to increase the comprehensiveness of generalizations. The observation proformas, the criterion measures, the control variables and the treatment time were kept constant for all the treatment groups and institutions.

Sample

Various teacher-education institutions from different parts of the country were approached of which 15 volunteered. During the experimentation stage, six of them dropped out because of certain administrative difficulties. Others could successfully complete the experiment. These institutions cover different regions of India—north, south, east and west. Again, one of these nine institutions, namely, Regional College of Education, Mysore, could not stick to the standardized treatments. Hence, this institution has not been included for final collection of the data and analysis. The names of the institutions and the corresponding code numbers used are given in Table 1.

Treatment

A common procedure was followed by various institutions while conducting the experiments. After the sample for each study was selected, it was randomly distributed among three equal groups. One of the groups received Standard Microteaching Technique (SMT), the other Modified Microteaching Technique (MMT) and the third received the Traditional Technique (TT) of teacher-training. The details of these treatments are given in the following paragraphs.

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Table 1
PARTICIPATING INSTITUTIONS AND THEIR CODE NUMBERS

<i>Code Number</i>	<i>Institution</i>
TEI 1	Lady Irwin College, New Delhi
TEI 2	DAV College of Education, Abohar
TEI 3	Department of Education, South Gujarat University, Surat
TEI 4	VICS College of Education, Surat
TEI 5	Regional College of Education, Ajmer
TEI 6	Government College of Education, Ratnagiri
TEI 7	Regional College of Education, Bhubaneswar
TEI 8	Regional College of Education, Bhopal
TEI 9	Regional College of Education, Mysore

Procedure for SMT

The following procedure was adopted by the participating teacher-educators for the Experimental Group I using the treatment of SMT.

STEP 1 : ORIENTATION ABOUT MICROTEACHING

Theoretical discussion about the concept of microteaching was conducted. The merits and demerits of microteaching were explained. The pupil-teachers were also oriented about the project, its purpose and scope.

STEP 2 : DISCUSSION OF TEACHING SKILLS

The concept of teaching skills was clarified first. The five teaching skills which were discussed at the Baroda/Surat workshop were explained at length with the help of the handbooks on specific teaching skills developed by the CASE. One skill at a time was discussed before practice. The student-teachers were trained in observing the corresponding teaching skill.

STEP 3 : PRESENTATION OF MODEL LESSONS

The model lessons of the corresponding teaching skill were demons-

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trated by the investigator in all the method subjects chosen by the student-teachers. These model lessons were the same as given in the CASE handbook on teaching skills (Passi, 1976).

STEP 4 : PREPARATION OF MICRO-LESSON PLANS

Standard lesson format as given in the handbooks was used. One unit concept was selected for a micro-lesson.

STEP 5 : MICROTEACHING SETTING

The following was the microteaching setting under this standard procedure :

(a) Time :

Teach	6 mts.
Feedback	6 mts.
Re-plan	12 mts.
Re-teach	6 mts.
Re-feedback	6 mts.
<hr/>	
Total	36 mts.
<hr/>	

- (b) Number of pupil-teachers : 10
(c) Supervisor : 1 or 2
(d) Feedback by the peer supervisors.
-
-

STEP 6 : TREATMENT UNDER SIMULATED CONDITIONS

STEP 7 : SEQUENCE OF SKILLS

The five skills were developed in the following order :

- (i) Probing Questioning
(ii) Stimulus Variation

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- (iii) Reinforcement
- (iv) Explaining
- (v) Illustrating with examples.

STEP 8 : OBSERVATION OF TEACHING SKILLS

The teaching skills being developed through micro-lessons were observed by the peer supervisors with the help of both the types of observation schedules (frequency as well as rating) given in the handbooks. The ratings based on the frequencies were given after the lesson on rating-type schedule.

STEP 9 : FEEDBACK

Immediate feedback was given to the student-teachers individually. The feedback was based on the tallies and the ratings on the observation schedules and the interpretation in the light of model lessons.

STEP 10 : TEACHING TIME

Two lessons for each of the five skills were given by the trainees. Teaching time devoted to 10 microteaching lessons and equal number of traditional teaching (TT) lessons were the same.

Procedure for MMT

This treatment was exactly the same as the standard microteaching technique (SMT) except for the deliberate variation to be brought about in any one of the components of microteaching approach. The various components and the corresponding variations that can be brought out are given below :

1. *Modelling* : (i) visual—films and/or persons, (ii) symbolic, (iii) audio.
2. *Microsetting—time* : (i) 5 minutes, (ii) 10 minutes, (iii) 15 minutes.
3. *Microsetting—size of the class* : (i) 5 pupils, (ii) 10 pupils, (iii) 20 pupils.
4. *Conditions* : (i) simulated, (ii) real, (iii) mixed (simulated+real).
5. *Supervision and Feedback* : (i) pupils, (ii) peers, (iii) supervisors, (iv) tape-recorder, (v) self/no feedback,

(More variations in feedback like immediate/delay, written/oral/both, individual/group, descriptive/prescriptive, rating/category/sign system of supervision, and so on, can be had.)

6. *Teach/Re-teach* : (i) teach-reteach with same units, (ii) teach-reteach with different units.

Of the nine institutions included in the study, five of them have brought in variation regarding feedback—peer (SMT) and supervisor (MMT), two of them have brought in variation with respect to modelling—perceptual (SMT) and symbolic (MMT), and two institutions had no MMT group.

Procedure for TT

By and large, the traditional technique of teacher-training involves the discussion of principles of teaching and demonstration lessons. Subsequently, the student-teachers are required to give lessons in real classes for a period of 35 to 40 minutes. The student-teachers prepare lesson plans, discuss them with their supervisors and teach the same to a full class for the entire period. The supervisor supervises the lesson for the full or part of the period. The presence of regular teacher of the class is not essential during the lesson being taught by the student-teacher. The supervisor writes his comments either on the lesson plan or observation notebook. The pupil-teacher, if he so likes, may have brief post-lesson discussion in the college when they meet next or in the practising school itself, depending upon the availability of the supervisor. Peers also sometimes observe lessons of the fellow student-teachers, and an informal discussion may take place.

Data Collection

After the three groups were formed, the Ahluwalia's Teacher Attitude Inventory was administered to all the three groups. All the student-teachers in the three groups were observed on Baroda General Teaching Competence (BGTCC) schedule for the first two regular lessons in the schools by the investigator along with or without another college supervisor. The mean performance of the student-teachers on the two lessons formed the pre-test scores. They were subjected to respective treatments. Each trainee in the experimental groups gave two micro-lessons on each skill and in all the ten lessons which corresponded to ten regular lessons of 40 minutes by the TT groups (control group). After these ten lessons,

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all the trainees in all the three groups were observed on the BGTC schedule for two regular lessons in the school by the same supervisors. The mean performance on the two lessons formed the post-test scores. The practice continued for all the three groups in regular school conditions and after they gave five lessons again they were observed on the BGTC schedule for two regular lessons of 40 minutes by the same supervisors. The mean performance on the two lessons formed the retention scores. The design of the experiment is shown below :

SCHEMATIC PRESENTATION OF THE EXPERIMENTAL DESIGN

<i>Experimental Groups</i>		<i>Control Group</i>	<i>Approximate time required</i>
<i>SMT</i> <i>N=10</i>	<i>MMT</i> <i>N=10</i>	<i>TT</i> <i>N=10</i>	
<i>Administration of Ahluwalia's Teacher Attitude Inventory</i>			
<i>Observation of two regular lessons on the BGTC schedule (Pre-test)</i>			<i>1 week</i>
<i>Orientation to microteaching</i>			
<i>Explaining the demonstrating teaching skills and practising the five skills in 10 micro-lessons—two for each skill</i>			<i>6 weeks</i>
<i>Observation of two regular lessons on the BGTC schedule (post-test)</i>			<i>1 week</i>
<i>Continuation of practice teaching in regular classes in schools, five lessons to be covered</i>			<i>1 week</i>
<i>Observation of two regular lessons on the BGTC schedule (retention test)</i>			<i>1 week</i>
<i>Total</i>			<i>10 weeks</i>

Tools Used

Two types of tools were used : (i) Ahluwalia's Teacher Attitude Inventory for description of the sample and (ii) Baroda General Teaching Competence Scale and evaluation proformas developed for each of the skills for criterion measures. A brief description of each of the above tools is given below.

(i) *Ahluwalia's Teacher Attitude Inventory*. This attitude inventory developed by Ahluwalia (1974) consists of 90 items distributed over six sub-scales which were developed by Likert's summated ratings procedure. Each scale has 15 statements related to a particular aspect of prospective and practising teachers' professional attitudes. The six aspects included are : Attitude towards (i) teaching profession, (ii) classroom teaching, (iii) child-centred practices, (iv) educational process, (v) pupils, and (vi) teachers. The responses have to be given on a five-point scale. The split-half reliability is found to be 0.79 ($N=239$). The test-retest reliability after intervals of three months and nine months are found to be 0.59 ($N=102$) and 0.64 ($N=290$). The inventory has content validity. The state-wise and area-wise norms for the five Hindi-speaking states have been computed.

(ii) *Baroda General Teaching Competence Scale (BGTCS)*. It is a rating observation proforma to measure general teaching competence developed at the Centre of Advanced Study in Education, Baroda. It has 21 items related to planning, presentation, evaluation and classroom management to be rated on a seven-point scale. The total of the ratings form the score on the schedule.

(iii) *Evaluation Proformas for Different Teaching Skills*. For observing the five teaching skills, namely, skills of probing questioning, stimulus variation, reinforcement, explaining and illustrating with examples two types of evaluation proformas—frequency type and rating type—were used. All these proformas have been developed at the Centre of Advanced Study in Education, Baroda. Each of these proformas have items related to the various components of the corresponding teaching skill. The frequency type proformas were used during the micro-lessons, whereas the rating type were used after the lesson. In the present study, both types of proformas were used for the purpose of giving feedback only.

Analysis

The data of each institution were analysed separately by the respective investigators. The scores on the BGTCS schedule administered at various stages of the experiment were converted into percentage scores as some of the items in the schedule were not being rated by the investigators. The difference between the pre-test and post-test scores (Gain Scores— G_1), the post-test and the retention-test scores (Gain Scores— G_2) and between the pre-test and the retention-test scores (Gain Scores— G_3) were computed. The three sets of gain scores— G_1 , G_2 and G_3 —formed the criterion scores.

Means and standard deviations of G_1 , G_2 and G_3 were computed. The significance of difference between means between the groups were compared using t-test.

The results of the institution-wise analysis are not presented in this paper.

*Analysis of the Pooled Data**

The analysis of the co-variance was used to adjust for the effect or attitude on the scores of attitude on the general teaching competence of student-teachers and to apply tests of significance on the criterion variable. For this purpose, the scores of the subjects on attitude (co-variate—Y) and general teaching competence (criterion—X) of the control and experimental groups of six institutions (TEI₂, TEI₃, TEI₄, TEI₆, TEI₇, TEI₈) were pooled. The scores on these in respect of subjects of TEI₁, TEI₅, TEI₉ were excluded from the combined analysis because attitude scores were not available for the subjects of TEI₁ and TEI₉ and the experimental treatment—II (MMT) was not given to the subjects of TEI₅.

The following procedure was followed to test the significance of the difference between the adjusted means of the general teaching competence scores (X) of six institutions, each having three groups : TC (Control Group), SMT (Experimental-I) and MMT (Experimental-II) using analysis of co-variance.

- (i) Total sum of squares on both Y and X was partitioned into two components—within-groups and between-groups—using analysis of variance formulae.
- (ii) The total sum of products was partitioned into two components, within-groups and between-groups sums of products.
- (iii) An adjusted total sum of squares on X to remove the linear effects of the co-variate Y was calculated.
- (iv) An adjusted within-groups sum of squares on X using the within-groups regression of X on Y was calculated.
- (v) An adjusted between-groups sum of squares by subtraction was calculated.
- (vi) The variance estimates were obtained by dividing the adjusted within-groups sums of squares on X by the respective degree's freedom.

* Assistance of Kumari Madhu Raizada, JRF, in the analysis of data is thankfully acknowledged

(vii) Significance of the adjusted means on X was tested by referring to obtained value of F (ratio of variance estimates).

Table 2
SUM OF SQUARES AND SUM OF PRODUCTS

SUM OF SQUARES					
	Y (Co-variate)			X (Criterion)	
Between	11677208.00	—	3892402.67	=	7784805.33
Within	11811291.00	—	11677208.00	=	134083.00
Total	11811291.00	—	3892402.67	=	7918888.33
SUM OF PRODUCTS					
Between	624011.00	—	623973.70	=	37.30
Within	795028.50	—	624011.00	=	171017.50
Total	795028.50	—	623973.70	=	171054.80

The adjusted total sum of squares for X is

$$62363.49 - \frac{(171054.9)^2}{7918888.33} = 58526.99.$$

The adjusted within-groups sum of squares is

$$36971.89 - \frac{(171017.50)^2}{134083} = 12533.86.$$

The adjusted between-groups sum of squares is

$$58526.99 - 12533.86 = 45993.13.$$

The variance estimates are :

$$S_b^2 = 22996.56$$

$$S_w^2 = 66.31$$

and

$$F = \frac{22966.65}{66.31} = 342.3$$

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The following table summarizes the analysis of co-variance.

Table 3
ANALYSIS OF CO-VARIANCE FOR THE DATA OF TABLE 2

SOURCES OF VARIATION			
	<i>Between</i>	<i>Within</i>	<i>Total</i>
Sum of squares : Y	7784805.33	134083.00	7918888.33
Sum of squares : X	25391.60	36971.89	62363.49
Sum of products	38.54	181017.26	471105.98
Adjusted sum of squares : X	45993.13	12533.86	58526.99
Degrees of freedom of adjusted sum of squares	2	188	190
Variance estimates	22996.56	66.67	308.04
$F = \frac{22996.56}{66.67} = 344.93 \quad P < .01$			

The value of $F=344.93$ is highly significant. It is, therefore, quite clear that all the variations in X cannot be attributed to the influence of the uncontrolled variable Y. There are real differences in the values of X of TT, SMT and MMT groups.

In order to test the significance of difference between the means of the three groups taken two at a time, the adjusted means on X were calculated using the following formula :

$$\bar{X}''_j = bw (\bar{Y} - \bar{Y}_j) + \bar{X}_j$$

where
$$bw = \frac{181017.26}{134083.0} = 1.35$$

The adjusted means for TT, SMT and MMT groups respectively are :

$$\bar{X}''_1 = 1.35 (246.61 - 246.39) + 6.15 = 6.447$$

$$\bar{X}''_2 = 1.35 (246.61 - 248.69) + 16.46 = 13.382$$

$$\bar{X}''_3 = 1.35 (246.61 - 244.75) + 16.92 = 19.431$$

Significance of difference between the means of GTC scores of TT and SMT groups :

$$\begin{aligned}
 t_x &= \frac{\bar{X}''_2 - \bar{X}''_1}{\sqrt{s^2 \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}} \\
 &= \frac{6.935}{8.14 \times 1.414 \div 8} \\
 &= 4.84 \quad P < .01
 \end{aligned}$$

(ii) Significance of difference between means of GTC scores of SMT and MMT groups :

$$\begin{aligned}
 t &= \frac{\bar{X}''_3 - \bar{X}''_2}{\sqrt{s^2 \left(\frac{1}{n_3} + \frac{1}{n_2} \right)}} \\
 &= \frac{6.04}{11.40 \times 1.414 \div 8} \\
 &= 4.21 \quad P < .01
 \end{aligned}$$

(iii) Significance of difference between means of GTC scores of TT and MMT groups :

$$\begin{aligned}
 t &= \frac{\bar{X}''_3 - \bar{X}''_1}{\sqrt{s^2 \left(\frac{1}{n_3} + \frac{1}{n_1} \right)}} \\
 &= \frac{12.984}{11.40 \times 1.414 \div 8} \\
 &= 9.04 \quad P < .01
 \end{aligned}$$

Results

The F-ratio=344.93 being highly significant shows that a substantial part of the variation in the X means cannot be attributed to the differences in Y means. Since the linear effects of the co-variate Y have been removed, the differences in the X means are attributed to the treatment. Therefore, it can be safely ascertained that the differences in the GTC means of the

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TT, SMT and MMT groups are due to the treatment rather than due to sampling error and/or effects of attitude scores of the student-teachers.

Further, the t-ratio being significant at .01 level, the following *a priori* hypotheses stand sustained.

1. The General Teaching Competence (GTC) scores of student-teachers taught through Standard Microteaching Technique (SMT) will be higher than the student-teachers taught under Traditional Technique (TT) of the teacher-training.
2. The General Teaching Competence (GTC) scores of student-teachers taught through Modified Microteaching Technique (MMT) will be higher than student-teachers taught under Traditional Technique (TT) of the teacher-training.

However, the third hypothesis that there are no significant difference between the GTC scores of SMT and MMT groups can be rejected because the t-ratio is highly significant. It may be further added that GTC mean score of MMT group is higher than mean score of SMT group.

Thus, it can be concluded that the student-teachers trained through standard microteaching or modified microteaching technique acquire higher general teaching competence as compared to the student-teachers trained under the traditional teacher-training technique or the usual practice teaching programme.

Implications

The results will be shortly available. Nevertheless, some of the implications of the present results are very vivid. The microteaching has proved to be a better training approach when considered in terms of teaching competence measured through BGTC schedule. If this generalization can be extended to a population of colleges of education in India, then a variety of implications would emerge. These are :

(a) *Training of Resource Personnel.* The implementation of microteaching requires a large-scale orientation of teacher-educators throughout the country. With the limited and other commitments, it is neither possible nor advisable to train all the teacher-educators. Therefore, a body of resource personnel who, in turn, can orientate teacher-educators will have to be developed. For this purpose a programme of training resource personnel will have to be started at the earliest.

(b) *Production of Materials.* The materials for microteaching in India were not available till 1972. Some efforts have been made in this direction

by the Centre of Advanced Study in Education, Baroda. The material in the form of instructional handbooks, model lessons and evaluation proforma are available for 13 instructional skills. There is need for developing such materials for other important teaching skills. Besides this, the skill-based training packages may be developed which may also include the development of audio-tapes as well as films.

(c) *Modification in the University Requirements.* Any change to be brought about in the B. Ed. programme should receive university approval in terms of necessary modifications in the requirements prescribed for B.Ed. Unless universities recognize micro-lessons equivalent to traditional lessons for the purpose of counting toward the minimum prescribed lessons, the teacher-education institutions will find it extremely difficult to use micro-teaching technique in their student-teaching programmes. Therefore, it is desirable to approach university authorities for amending the present regulation and requirements to facilitate quicker adoption of microteaching in colleges of education.

(d) *Reshaping of Student-Teaching Programme.* Agencies like NCERT and CASE may take up the revision of B. Ed. curriculum, particularly the programme of student-teaching. Objectives have to be restated in terms of teaching skills and behaviours. This would prepare ground for smooth adoption of microteaching techniques in the colleges of education.

(e) It has been established that microteaching as a training technique is more effective than the traditional approaches. Nevertheless, certain fundamental issues related to the administrative feasibility and conceptional improvements are worth exploring. Research studies at institutional and individual level should be undertaken and encouraged. The agencies such as UGC, NCERT, State Boards of Teacher Education, NCTE, and universities should gear their research scheme and other programme in this direction.

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Philosophy of Education

An Indian Approach

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There is a feeling in the country to reorientate the courses in Philosophy of Education as the corresponding courses and curricula in this field have undergone changes in the west in recent times. Here an attempt has been made to give a few suggestions as to how this reorientation should be guided in the light of Indian approach.

The paper starts with a discussion of the nature of philosophy from the western standpoint and how it has affected the nature and scope of philosophy of education there. It then proceeds to discuss the typical characteristics of Indian philosophy. Since in India, philosophy, education, religion, psychology and ethics were all intertwined, we have to separate the strands to develop Indian philosophy of education as a discipline. General hints have been given to show how typical characteristics of Indian philosophy to affect its philosophy of education and how the eternal and universal principles of one philosophy of education can help in bringing forth universal peace—a long cherished goal. The paper pleads for intensive research in this much neglected area.

Introduction

WHAT DO we mean by philosophy of education? What is its nature and what is its scope? These questions are relevant because the definitions of the terms 'philosophy' and 'education' have been under controversy in the West. The traditional philosophers concern themselves with questions of

metaphysics, epistemology, ethics and logic but lately the philosophers of the Analytic School have tried to dispossess philosophy of its traditional status and function and pointed out that the only function left to it is 'linguistic analysis'. The same way it is still more difficult to arrive at a general definition of education. In this paper we shall use education both in the sense of formal education or schooling and in the sense of education as a life-long process.

The term 'philosophy of education' presumes that there is some relation between the two—'philosophy' and 'education'. What kind of relation is it? The controversy on the term 'philosophy' in its turn raises controversy as regards the nature of the discipline 'philosophy of education'. The advent of 'philosophic analysis' and 'logical positivism' point towards the phenomenon of 'revolution' in the field of philosophy. According to O' Conner, "Philosophy is 'not a body of knowledge of a positive kind', but rather 'an activity of criticism or clarification'."¹ Further, pointing to the nature of philosophy, Elvin has stated that "Philosophy is a technique for thinking and is specially concerned with examining our assumptions and defining our concepts. Social philosophy and the philosophy of education are concerned with the assumptions we make and the concepts we use in thinking about society and education".² So 'philosophy is an activity and technique' which we may apply to any subject-matter and in this way we have the philosophy of science, philosophy of religion, the philosophy of education, and so on. Thus the traditional function of philosophy of education as deducing 'a rather definite set or system of educational principles and practices from general philosophy' was replaced by the new function assigned to it, that is of 'clarifying the language used and in pointing out underlying assumptions of certain beliefs expressed in educational literature'.

Let us mention here that the new philosophies—linguistic analysis and logical positivism which had tried to decry that metaphysical base of the traditional system—could not point out to the educators their role as what to do. They were unable to tell what sort of philosophical and educational principles should guide the schools of the nation. So, soon a reaction arose against them and we still find philosophers who believe that philosophy has a function other than sheer analysis. Waisman, asked the question if

¹D. J. O. Connor, *An Introduction to the Philosophy of Education*, Routledge, 1957, p. 4

²H. L. Elvin, *Education and Contemporary Society*, C. A. Watts & Co., 1965, p. 65

philosopher's function is merely that of a 'fog-dispeller'. Waisman, going beyond Wittgenstein, pointed out that "the function of the analyses of philosophy, including the study of language is to enable us to see in a new way".³ In fact the attacks against the traditional views of philosophy arose because of the verification and the kind of rational justification to be expected of metaphysical statements. As a counter-attack it was pointed out that metaphysics is not a demonstrable science though philosophy does possess its tests of greater or lesser approximation to truth—the familiar tests of coherence or consistency of comprehensiveness. By referring to this controversy we can safely conclude that even the Western world recognizes that philosophy is not merely linguistic analysis and in philosophy of education the educational philosophers believe that "questions of education do press upon ultimate questions, including metaphysical ones. And even if philosophy of education cannot itself explore all the arguments fully it will be a legitimate part of its work . . . to examine what the implications for education will be, if such a philosophical position is adopted".⁴ So the functions of the traditional educational philosophy should be supplemented by the analytic philosophy. This view is fully supported by Brubacher who observe in the preface to his book *Modern Philosophies of Education* :

I do not side with the notion that a revolution has occurred in philosophy which makes clarification the exclusive function of the discipline. I do think ideological considerations are important for the teacher and the administrator.

Brown has further clearly pointed out the role of the analytic philosophy when he says, "The analytic strand in philosophy is neither an isolated one nor a contemporary one. It is at least as old as Socrates, and it frequently complements other approaches".⁵ "Philosophy... is an activity of inquiry whose dual functions of clarification and reflection are complementary... While clarification may expose imperfections of reason and purge many loose and unwarrantable assertions, it may be primarily reflection that makes a humanity of philosophy".⁶

If traditional philosophy in the West became the object of attack by the newer philosophies, it was because the philosophy in the West is only

³L. A. Reid, *Philosophy and Education*, 1962, p. 11

⁴*ibid.*, p. 14

⁵L. M. Brown, *General Philosophy in Education*, 1966, p. 214

⁶*ibid.*, p. 223

'a thinking consideration of things'. In order to understand the nature of Indian philosophy of education as different from that of the West, we have first to understand the nature of philosophy from the Indian standpoint.

Nature of Indian Philosophy

The concept of philosophy in the East differs from that in the West. In the West, philosophy has been an arm-chair speculation. But, here in India, philosophy has arisen out of its practical necessity in life. Indian philosophy comprises both orthodox and non-orthodox schools. To the former group belong the philosophical systems of Nyaya and Vaisheshika, Sankhya and Yoga, Mimamsa and Vedanta which are pro-Vedic; to the latter group belong the Jaina, Bauddha and Charvaka (materialist). Leaving the Charvaka materialist, 'the original and express motive of each system' is practical in the sense of helping man to attain perfection and to be freed from the threefold miseries of life—*Adhyatmik*, *Adhidatvik* and *Adhibhautik*. In India philosophy has not been only a view of life but also a way of life.

Here in India concern with the problems regarding man and the universe and all important matters relating thereto, which is usually regarded as essential to the metaphysical venture, has been subordinated either overtly as in the case of Buddhism and the Sankhya or implicitly as in the case of the majority of the remaining schools of Indian philosophy to the concern with the most human of all problems, that of the ultimate destiny of man and its fulfilment. Whether this was proper from the strictly metaphysical point of view need not be discussed here. Philosophical modernism is, of course, more likely than not to be in favour of negative answer to this question. But all that may be said in this regard is that modern knowledge, in spite of the tentatizing effect it has succeeded in producing, is after all no rival of ancient wisdom.

As Max Muller puts it, "Philosophy was recommended in India not for the sake of knowledge but for the highest purpose that man can strive after in this life."⁸ "Creative Indian philosophy is thus oriented from the

⁷N. V. Banerji, *The Spirit of Indian Philosophy*, 1974, p. 134

⁸K. M. Max Muller, *Six Systems of Indian Philosophy*, 1961, p. 370

beginning to ideal life or freedom. It is not mere theoretical study of truth as it was in the West."⁹

Classical Indian philosophy was not divided into watertight compartments like ethics, metaphysics, psychology, logic or theology as in the West. Rather, philosophy was "a unitary study developing different kinds of problems but dovetailing the solutions in the overall context of the realization of freedom."¹⁰

Metaphysics and ethics are inextricably intertwined and interdependent in Indian philosophy. Metaphysics arises due to the desire 'to attain freedom self-consciously' and it is this very desire which is "the fountainhead and the ultimate objective of ethics... Details of ethics emerge only when metaphysics is applied to empirical conduct."¹¹

In Indian philosophy logic was not distinguished from psychology (of knowledge) except occasionally. What is the science of formal logic in the west and the metaphysics growing out of it"¹²—all this was unknown to the Indian mind. Though we did not have a separate school of philosophy in ancient India of linguistic analysis yet Indian thinkers applied logic thoroughly and carried their conceptual and linguistic analysis to the utmost limit of subtlety—"a feat which even philosophers of the modern school of analysis have not yet achieved."¹³ Concepts in Indian philosophy have been developed on the basis of sound reasoning and arguments. "Every concept there was carefully analysed, classified, and compared with other concepts. The Indian mind was constitutionally logical in this sense. Clarity was a keynote of Indian thinking."¹⁴ Concepts of God, self, identity, difference, subject, predicate, etc. were thoroughly studied. There was analytical study of categories—substance, attribute, action, universal, etc. Alongside also "developed in Indian systems a superbly analytical study of the ways of knowing on the one hand—a marvellous methodology with enough of epistemology and psychology—and, on the other hand, speculative though largely reasoned out cosmologies and cosmogonies."¹⁵ Of educational interest are the methodologies and different psychologies of knowledge developed in different systems.

⁹K. D. Bhattacharya, *Philosophy, Logic and Language*, 1969, p. 248

¹⁰*ibid.*, p. 230

¹¹*ibid.*, p. 225

¹²*ibid.*, p. 248

¹³*ibid.*, p. 249

¹⁴*ibid.*, p. 226

¹⁵*ibid.*, p. 260

Just as analytic philosophy has tried to dethrone metaphysics from its high pedestal in the west because of the speculative character of the traditional philosophy, the metaphysics in classical Indian philosophy can never be treated on that level because here:

The Indian metaphysics is almost a matter-of-fact study of reality conducted in a thoroughly intelligible manner to the end. It is candidly admitted that reals are either perceived or inferred from perceptual data or known through some other legitimate process of mediation, and if in a good number of cases, they are accepted on faith because we have them respectable sources, we are instantly reminded that either we have to substantiate these, as far as possible through normal methods of inference and the like or in case such normal methods fail, we have to try to grasp the truths intuitively through esoteric exercises and never stop till these are grasped. There is no talk anywhere in Indian philosophy of thought or reason as opposed to sense experience and none of the forms or categories that are called *a priori*. If Indian metaphysics has thus been a matter-of-fact study, Indian epistemology is none other than detailed psychology of knowledge or a branch of the matter-of-fact metaphysics, nothing of a mysterious brand like Kant's Critique or Husserl's Phenomenology.¹⁶

That is why the word that has been used for philosophy in India is *Darsan*—meaning 'seeing' or 'experiencing'. "The ancient Indian did not stop at the discovery of truth but strove to realize it in his own experience".¹⁷ Each system of Indian philosophy as a matter of fact represents a particular way of life to be pursued by the different groups of people according to their mental or spiritual level.

Philosophy of Education

In the West,

Philosophy of education is one of the oldest yet one of the newest disciplines. It is one of the oldest since Plato—the philosopher par excellence of ancient times—devoted considerable attention to the nature, purposes and content of education. It is one of the newest since philosophy of education began to emerge as a separate discipline only in

¹⁶ibid., p. 249

¹⁷M. Hiriyana, *Outlines of Indian Philosophy*, 1951, p. 18

the twentieth century. More specifically, Dewey's might be considered the first systematic treatment of philosophy of education. Since his time it has become an object of considerable study.¹⁸

In our country also the philosophy of education as a separate intellectual discipline had not taken its shape in ancient times because with us life, philosophy, religion, psychology, ethics and education were all intertwined. To have a separate discipline we are trying now to separate the strands one from the other and not deduce philosophy of education from the purely speculative metaphysical beliefs as in the West. So this separation or derivation of various philosophies of education from the different Indian systems is a subject for research for those interested in this field.

In the West, there are different philosophies of education and consensus is being sought among 'warring educational philosophies' for, as J.S. Brubacher points out, "Consensus is indispensable to any sort of social cohesion."¹⁹ 'Ordered pluralism' and 'organic philosophy of education' are some suggestions coming forth to resolve the problem. We cannot enter into detail here in this paper how consensus is being sought after, but we have to point out here that although each system of Indian philosophy presents its views of the universe, one special feature of the Indian systems is that they all agree on certain fundamentals, e.g. (a) achievement of *mukti* or final release from the bonds of existence is the highest aim, (b) the cause of bondage is *avidya* or ignorance, (c) *vidya* or knowledge is necessary for liberation, (d) mere theoretical knowledge is not sufficient, hence, (e) the need for practical discipline of life. "Moral and physical discipline must accompany study, reasoning, intense concentration on and repeated meditation of the philosophical truths so that every thought, speech and action in life may reflect them."²⁰ Different philosophies are more than theoretical discussions, rather, they are different perspectives to mould the lives of people. But in spite of their theoretical differences all the schools of Indian philosophy "insist upon a common pattern of intellectual, physical and moral discipline which stamp them all as Indian."²¹

¹⁸A. M. Dupis, *Philosophy of Education in Historical Perspective*, First Tomson Reprint, 1972, p. 1

¹⁹J. S. Brubacher, *Modern Philosophies of Education*, 4th edn., McGraw-Hill, 1962, p. 366

²⁰D. M. Datta, *Chief Currents of Contemporary Philosophy*, 1961, p. 568

²¹*ibid.*

Because of this unity among the systems which is due to their moral and spiritual outlook Indian philosophy differs sharply from its Western counterpart in the sense that it constitutes a definite way of approach to all educational problems which are centred round three questions : 'Why?', 'What?', and 'How?' As already pointed out, this is the area where research is to be undertaken to explore the answers of the three questions from the standpoint of different philosophical systems of India.

That there is ample agreement among the different philosophical systems can be corroborated from the standpoint of J. C. Chatterji when he says in his book *Hindu Realism* that the metaphysical systems in India are not mutually contradictory, rather they form a graduated series of three standards suited to different types or grades of mind—different in intellectual capacities and temperaments. The three standards being (i) Nyaya Vaisheshika (the realistic standard), (ii) Sankhya Yoga (the psychodynamic standard) and (iii) Vedanta (the polymimic standard). They all lead to the same practical end. According to him the function of philosophy is not the discovery of metaphysical truths by reasoning and inference, but only the explaining and understanding rationally truths already discovered and realized by direct experience on the part of the Rishis. The truths are one and the same but they have been taught differently in order to suit different minds just as "the Grammar of Sanskrit or Greek may be taught in different standards such as practical, historical, philological, and so on."²²

The approach of Indian philosophy is most secular since it has been addressed to the mankind and not to any particular sect, caste, creed or sex. Its approach is most democratic as it recognizes the dignity of each individual self. Besides, it tries to view life steadily as a whole and not in any watertight-compartment way. These characteristics find reflection in the answer to the three fundamental questions of educational philosophy—'Why?', 'What?' and 'How?'

Why?

'Why' is concerned with the aims of education. Aims are determined by the values of life. Indian philosophy believes in four cardinal values of life—*dharma* (the discharge of duties and responsibilities and the practice of virtues), *artha* (the acquisition of wealth for use), *kama* (the enjoyment of the pleasures of life) and finally, *moksha* (freedom from a sense of want).

²²J. C. Chatterji, *Hindu Realism*, 1912, p. 8

and the attainment of liberation). This scheme of life is far removed from any attempt at a rejection of the world. Indian thought invariably hints in the direction of achieving the synthesis or unity of the world of spirit and matter and they were not seen as antagonistic to each other but as complementary and vitally related. All the systems regard *moksha* or freedom or self-realization as the ultimate or the highest aim of life and of education. The branch of Indian philosophy which is concerned with ways and means to achieve this aim is known as Yoga or the 'philosophy of *sadhana*'. The practice of Yoga is not affected by the theological differences of the conception of God. The *sadhak* with his own religious conception of God can practise it and be helped immensely through it. Even one can adapt the practice to his own theological interpretation of the truth. "In other words, a Hindu, Christian, Jew, Buddhist or Mohammadan is equally qualified if he has an intense desire to live a spiritual life."²³

Education as a lifelong process is concerned with this ultimate aim. In modern formal educational institutions we can make the student at least aware of the possibility of realizing this aim. There can be one or two forest universities where such aspirants may continue their spiritual exercises and may enlighten the world with fruits of their achievement.

The values of *dharma*, *artha*, *kama* and *moksha* also point to the specific aims of education pertaining to finite, mundane life, i.e. moral, mental, physical, vocational, cultural and spiritual aims. *Dharma*, the leading value, will constantly keep the individual on guard to see that he does his duty towards his own self and to the other members of society and is thus on the right path to achieve the spiritual goal.

There are two paths by following any one of which the individual can embark on his journey to realize the highest goal : (i) *Nivritti Marg* (the path of direct realization), and (ii) *Pravritti Marg* (the path of progressive realization). The first path is extremely difficult and hence is adopted by rare personalities. Such followers directly embark upon the last stage of life—*Sanyasa*—after finishing their first period of life, namely, *Bramhacharya Ashram*. The second path is adopted by the majority who begin with the *Bramhacharya Ashram* (the period of ascertaining knowledge), pass through *Grihastha Ashram* (the period of social service), finally to enter the *Vanaprastha* and the *Sanyasa Ashrams*. The follower of the first has to ignore the last but one (*kama*). So in a broader sense the whole life is an education.

²³Swami Akhilananda, *Hindu Psychology*, 1948, p. 197

What ?

'What' refers to the subject of study. Synthetic attitude of the Indian philosophy is reflected very clearly in the field of curriculum. It hints at two kinds of knowledge : (i) Knowledge of the lower or empirical realm (*Para Vidya*) and (ii) Knowledge of the higher or spiritual realm (*Apara Vidya*). Knowledge of the higher realm (*Brahma*) is essentially of a different nature from that which we call knowledge in the ordinary sense. According to Hiriyana :

The higher knowledge may not enlighten us about the details concerning particular things but it gives us an insight into the principle of their being, as the knowledge of a lump of clay, for example, may be said to do in regard to everything made of clay. In this sense it may be described as complete knowledge and as such different from the lower knowledge, which even at its best is fragmentary. But there is no conflict between them.²²

Through the study of the ordinary subjects we can get a shadow of the higher reality and a desire to know and realize it. Dr. Annie Besant's educational philosophy amply hints in this direction by pointing out how each subject of study can help in the development of the 'life-side' and the 'politics-side' of the individual.

How ?

The question of 'how' is related with methodology of education. Leaving aside the methods of learning, self-study and teaching (which are the areas for research in Indian philosophy of education from the standpoint of various systems of philosophy), the traditional methods used for the acquirement of knowledge are :

- (i) *Shravan*—Receiving the truths as statements or propositions enunciating the truths, technically called 'hearing'.
- (ii) *Manan*—Understanding of the truths thus received by reasoning and by weighing arguments both against and for—technically called 'consideration' or 'rational demonstration'.
- (iii) *Nidhidhyasan*—Realization of truth by direct experience.

²²M. Hiriyana, *Outlines of Indian Philosophy*, 1951, p. 69

The methodology points to the practical aspect of the theory—the relation between knowing and doing. These three methods can be used both for the realization of the higher knowledge and for the achievement of the lower knowledge.

The question of 'how' also includes within its purview the question of discipline. Though the concept of discipline may differ slightly in different systems yet the basic factor on which all agree is the duty-consciousness according to one's Varna²⁵ and Ashram.

During the past five centuries the creative thinking in India suffered a setback. The 'quietism, acosmism, and defeatism' into which Indian thought had degenerated has now been overcome due to the influence of 'Western dynamism, realism and secularism'; and now India has recovered to re-shape her ancient philosophy to suit the modern conditions. But even in her recovery she has retained her typical and peculiar characteristics as can be seen in the philosophies of Tagore, Vivekananda, Dayananda, Aurobindo and Gandhi. If Indian philosophy has recovered itself to suit the modern conditions, why cannot its philosophy of education?

Indian society has always been facing new challenges now and then since the dawn of her civilization and amongst all upheavals her culture has shone as brightly as ever. Modern Indian society has new challenges before her : (i) The challenge of the democratic pattern of life, (ii) the challenge of the advancement of technology, and (iii) the challenge of how to reconcile 'Atom and Ahimsa'. Indian philosophy points out the solution that "political freedom and material progress are necessary but only as a means to ultimate spiritual peace and perfection so that they should be attained in ways not detrimental to the latter".²⁶ Not only Indian society but the world society is at unrest; it is in turmoil; it is war-torn. Indian philosophy has an answer as how to mitigate the sufferings in the national and international arena since it believes that "ultimate aim of every individual should be to perfect himself with a view to raising the world to perfection".²⁷ Indian philosophy has always insisted that her philosophical

²⁵A much-abused term because of its misinterpretation. In fact it had the concept of psychological differences among the individuals at its back. The concept implies the development of individual's personality both horizontally and vertically. It points towards the synthesis of individual and social aims, of cultural and vocational aim of life and education—a hint from Sri Aurobindo's educational philosophy.

²⁶D. M. Datta, *The Chief Currents of Contemporary Philosophy*, 1960, p. 578

²⁷ibid.

truths are not merely the objects of knowledge. They are to be practised so that men with broad philosophical outlook and controlled passions may help in building a peaceful world.

The preamble to Unesco lays down: "Since the wars arise in the minds of men it is in the minds of men that we shall have to lay the foundations of peace". The schools of the nation can help in this undertaking if the teachers are imbued with the ideals of the spiritual philosophy of our country, if they have an acquaintance with the Indian thought. According to Morrish :

Thought inevitably goes into action. Our sense of purpose or lack of it will guide our actions; our concept of values and our view or vision of the totality of existence will make us the sort of person we are, and will affect our 'dialogical' relationship with other people. If you believe that there are spiritual values, that there is an after life and that this present life is in some sense a preparation for it, your aims and practice in education are likely to be modified by it, even though you never take a class in religious education.²⁸

"A national system of education," says H. C. Dent, "has two vital functions to perform—a tradition-preserving function and a growth-facilitating function. In a time of social flux both these functions become overwhelmingly important. They decide the future." It is really deplorable that India even after achieving her independence and making such a hue and cry for the necessity of preserving her culture could not make much headway in furthering these dual functions of education. So intensive research is to be encouraged in the important emerging area of Indian philosophy of education if the spiritual ideals of our philosophy are not to remain merely a thing of the past. Research is to be undertaken to re-interpret the eternal and universal spiritual value to suit the modern social conditions. We have to derive Yuga Dharma in the light of the eternal (or Sanatana) Dharma. This would never mean 'looking backward'; it is simply to take advantage of the experience and wisdom of our ancestors in order to march ahead. In the venture of deriving Yuga Dharma we have to keep into consideration the interpretation of the modern Indian philosopher-educators who fully share the ancient Indian philosophical spirit. In

²⁸I. M. Morrish, *Disciplines of Education*, p. 43

order to plough the uncultivated field of the Indian philosophy of education we need cooperation between educationists and philosophers. We can think of setting up a 'Philosophy of Education Society' on the British pattern in India also, whose functions should be :

- (i) to evolve philosophies of education from the standpoint of different Indian philosophical systems;
- (ii) to bring the consensus among the different Indian philosophies of education to limelight;
- (iii) to analyse, clarify, and define the concepts—metaphysical, ethical, epistemological—involved in the educational philosophies on the basis of logical inquiry or the philosophic method and to justify philosophical ends and means in the modern context;
- (iv) to have more cross-fertilization between Indian philosophy and educational issues. The multifarious problems of education—arising both out of theory and practice of education and also arising in modern social context—and their solutions should be sought out in the light of Indian philosophical approach;
- (v) since Indian psychology is also intertwined with the Indian philosophical system there is need for research in the area of Indian psychology of education also, and
- (vi) since society is the means for realizing the truth, there is need for research in the area of Indian sociology of education.

CONCLUSION

The purpose of the whole discussion is to make out a case for a reorientation of our philosophy of education courses from the Indian philosophical standpoint. The paper attempts to remove two misconceptions regarding Indian philosophy and philosophy of education : (i) That it is other worldly, and (ii) that it does not encourage critical thinking on the part of the individual. It points out that this world is like a springboard for the individual to take a plunge to the other world (if he likes to take a plunge), otherwise the springboard should be kept tight so that the individual may not slip and fall. In other words, a man whether he wants to attain the ultimate end or not, he should be a perfect man on this earth fully conscious of his duty towards his own self and towards humanity. It thus encourages a humanistic attitude and a world outlook on the part of man. Further, as Indian philosophy has classified and analysed in detail different ways of knowing (*pramana*) in meticulous

EXAMINATION RESULTS OF THE UNIVERSITY OF KERALA

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Achievement Motivation in Relation to Personality and Intelligence

A Study

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The study was done to investigate the relation of achievement motivation with personality and intelligence, for which three tests—Mukherjee's Sentence Completion Test, Eysenck Personality Inventory (Hindi version of Form A) and Raven's Progressive Matrices Test were used respectively. The sample, consisting of 50 male students from intermediate arts class of a constituent college under Patna University, was divided into two groups (25 in each), on the basis of median. To compare both the groups, means and standard deviations were obtained for high and low groups separately. The t-ratio and correlations were computed to examine the relationship between achievement motivation with the personality dimensions and the intelligence.

From the statistical treatment it is clear that a relationship exists between certain dimensions of personality (extraversion and neuroticism) and achievement motivation. Similarly, there is a significant relationship between achievement motive and intelligence.

Introduction

THE WORK on achievement motive is comparatively recent in origin. The first major report of the experimental work on measurement of human motivation, particularly the achievement motive, was reported by McClelland (1953). Later, Atkinson did further research employing thematic apperception as the technique of measurement of human motivation. The wide employment of TAT for this purpose has not infused much enthusiasm among the researchers, hence the measurement of achievement motivation has taken a new dimension in recent years (Hermane, 1970 ; Witt, 1969).

Rating scales were also used to measure achievement motivation. Frandsen, Darke and Turney have used teachers' ratings and positively related them to academic achievement.

Divesta, Woodruff, Asahel and Hertel (1949) developed an orientation inventory for the purpose of measuring achievement motivation. Myers (1965) also, using an objective measure of n Ach, found it to be positively related to academic achievement.

In the present study the Sentence Completion Test (sct) was used to measure achievement motivation.

Hypotheses

The problem of achievement motivation and its correlates has been a topic of keen interest in the recent years. The purpose of the present study was to investigate the relation of achievement motivation with personality and intelligence. The hypotheses were :

1. There is a relationship between achievement and personality.
2. Subjects higher in achievement motivation will also be higher in intelligence than subjects lower in achievement motivation.

Method

Fifty first-year male students from intermediate arts class of a constituent college under Patna University volunteered themselves as subjects in the present study.

Three tests were used for the study. For measuring achievement, a Hindi version of Mukherjee's Sentence Completion Test was used. For

personality assessment, Eysenck Personality Inventory (Hindi version of Form A) was used, and to measure intelligence, Raven's Progressive Matrices Test was used.

To account for the subject's achievement scores the subjects were asked to answer the items of the Sentence Completion Test (SCT). The instructions were read out and only after they were completely understood did the students start answering the questionnaire. After that, Progressive Matrices Test (PMT) was administered. Finally, they were asked to answer the Eysenck Personality Inventory (EPI).

In order to test the hypotheses, the sample was divided into two groups, 25 in each, on the basis of median. The scores above the median

Table 1
MEDIANES OBTAINED FROM SCORES OF
THE THREE TESTS

SCT	22.11
PMT	32.32
E	12.15
N	7.13

were kept in the 'high group' and those below the median, in the 'low group'. To compare both the groups, means and standard deviations were obtained for high and low groups separately. The t-ratio was

Table 2
THE MEANS AND STANDARD DEVIATIONS OF
HIGH AND LOW GROUPS

HIGH			LOW		
<i>Mean</i>	SCT	30.6	<i>Mean</i>	SCT	17.32
	PMT	40.96		PMT	19.88
	E	14.56		E	9.64
	N	12.48		N	6.20
<i>Standard Deviation</i>	SCT	6.39	<i>Standard Deviation</i>	SCT	2.68
	PMT	4.81		PMT	6.51
	E	2.01		E	2.40
	N	2.44		N	2.25

PERSONALITY AND ACHIEVEMENT MOTIVATION

computed to test the significance of the difference between the means of the two groups. The correlation was also computed to examine the relationships between achievement motivation and the personality dimensions, and intelligence.

Results and Discussion

From the statistical treatment it is clear that a relationship exists between certain dimensions of personality and achievement motivation. Similarly, there is a significant relationship between achievement motive and intelligence.

The mean of high group on achievement motivation measured by SCT is 30.6, much higher than the low group whose mean is 17.32, t-ratio being 9.69, which is significant at .01 level.

Table 3
T-RATIOS OBTAINED FOR DIFFERENCE BETWEEN
MEANS OF HIGH AND LOW GROUPS

SCT	9.69	}	Significant at .01 level
PMT	12.92		
E	7.81		
N	8.82		

The mean of high group on PMT is 40.96 and that of the low group is 19.88, with t-ratio of 12.92, which is significant at .01 level.

On extraversion, the means of high and low groups are 14.56 and 9.64, respectively, and t-ratio is 7.81, which is significant at .01 level.

On neuroticism, the t-ratio is 8.82, which is significant at .01 level, with means of 12.48 in the high group and 6.20 in low group respectively.

To find if there is any relationship between achievement motivation and intelligence, the product-moment correlation was computed. The coefficient of correlation obtained is .49, which is significant at .01 level. This indicates that there exists a positive relationship between achievement motivation and intelligence. Subjects with high motive to achieve are also high on intelligence scores. Conversely, subjects with low achievement motivation are also low in intelligence.

Table 4

PRODUCT-MOMENT CORRELATIONS COMPUTED
TO FIND THE RELATIONSHIPS

Correlation between SCT and PMT	.49	} Significant at .01 level
Correlation between SCT and extraversion	.62	
Correlation between SCT and neuroticism	.28	Insignificant

Though intelligence is a cognitive ability and achievement motivation is a personality factor, some earlier studies (Lowell ; McClelland and Liberman ; Veroff; Atkinson, *et al.*) have shown that they are somehow interrelated. Our study has confirmed this. Thus, our hypothesis that subjects higher in achievement motivation will also be higher in intelligence than the subjects low in achievement motivation has been confirmed.

The investigators have found that achievement motivation is related to personality. The strength of achievement motive varies from individual to individual. In the same situation some persons seem to be highly motivated to achieve and some are not motivated at all.

The level of achievement motivation in a particular person at a particular time is conceived to be a function of two major factors : (a) the situation, and (b) the enduring strength of the motive in the individual personality. With the situation roughly constant for a set of subjects, the variation in scores should be chiefly diagnostic of the second factor.

Atkinson and Feathers (1966) have categorized personality traits under two headings—achievement-oriented personality, and failure-threatened personality.

In our study, two dimensions of personality were taken into account—extraversion and neuroticism. The correlation obtained between achievement motivation scores and extraversion is .62, which is significant at .01 level. The subjects high on achievement scores tend to be high on extraversion scores also. And quite oppositely, subjects with low achievement motivation are also low on extraversion.

The correlation was also computed to obtain the relationship between neuroticism and achievement motivation and the correlation found is .28, which is not significant. The subjects high on achievement scores tend toward neuroticism. The presence of high degree of achievement motivation may, therefore, account for some amount of emotional instability.

In a study by Shantamani and Hafeez (1968), a tendency towards negative correlation between need-achievement and neuroticism was found.

The correlation between extraversion and neuroticism shows that they are not related, for no significant positive correlation is obtained. This is in line with the findings of numerous studies done on extraversion and neuroticism (Eysenck). That extraversion and neuroticism are orthogonal factors has now been well established.

The extraversion and neuroticism were the two dimensions of personality with which this study was mainly concerned. Thus, our hypothesis that there is a relationship between achievement motivation and certain dimensions of personality has been confirmed.

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Programmed Learning in Meerut University

A Review

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This paper attempts to review the researches conducted in the field of programmed learning in Meerut University under the Faculty of Education. The studies focus on three aspects : (a) Development of programmed learning material (PLM) on various subjects and their effectiveness in terms of internal criteria ; (b) effectiveness of PLM in relation to learning characteristics, and (c) interaction effects between variables related to learner and variables related to PL. About 35 studies have been conducted at three levels—M.Ed., M. Phil., and Ph. D. PLMs have been developed in educational psychology, statistics, English, Hindi, Sanskrit, geography, botany and mathematics. Three styles of PLM—linear, branching and mathetics—have been prepared for primary, secondary, graduate and B. Ed. students.

Introduction

IN SPITE of its short history programmed instruction has made a breakthrough. Leading programmers have advocated the potential of such findings for 'emerging nations'. It is the first application of laboratory techniques utilized in the study of learning and teaching processes and in the practical problems of education. This knowledge about teaching may very well be a significant contribution of programmed instruction (Dececco, 1964).

PROGRAMMED LEARNING IN MEERUT UNIVERSITY

In 1954 the programmed learning movement took shape with the work of B.F. Skinner. Till now a lot of work has been done in this field. Programmed instruction and a wide variety of educational technology methods are being developed and are already in use in advanced countries like the USA, the UK, Canada, etc.

In India, the movement of programmed instruction came in early sixties. In 1963 some research scholars in the NCERT started developing programmed learning material. A seminar was organized at NIE, New Delhi in 1965 to acquaint some of the teacher-educators with this concept. Then in 1967, some of the enthusiastic persons formed an association of programmed learning and registered as Indian Association of Programmed Learning (IAPL). It organizes an annual conference on programmed learning. The first workshop on programmed learning was organized by the Department of Educational Psychology and Foundations of Education, NCERT, in October 1966 with Susan Markle as the consultant of the workshop. Now various departments, not only the colleges and universities but also the defence services, family planning services, agricultural industries like TISCO, TELCO, Sarabhai Chemicals, etc. have been taking keen interest in developing PLM.

Recognizing the need of the time, the Faculty of Education of the Meerut University has also taken a lead in this direction. The university has introduced a course for specialization in programmed learning at M. Phil. of education and psychology. The student is required to complete three courses—two theory and one practical in programmed learning. A course 'educational technology' has been introduced at M.Ed. and M. Phil. levels. This course is compulsory for M. Phil. students of education.

The Faculty of Education of the university has developed about 35 PLMS in various subjects. The details of these projects have been summarized in Table 1.

Table 1
DETAILS OF PROGRAMMED LEARNING MATERIALS

Year	Subjects				Total
	Languages	Social Sciences	Science and Maths.	Educational Psychology	
1968	1	—	—	3	4
1969	1	1	—	3	5
1970	4	—	—	1	5
1971	1	2	—	1	4
1972	—	1	1	2	4
1973	1	1	1	2	5
1974	2	1	1	4	8
	10	6	3	16	35

It may be noted from Table 1 that 10 PLMS have been designed in languages, six in social sciences, three in science and maths. and 16 in educational psychology. These PLMS have been developed in Hindi, English, Sanskrit, civics, economics, geography, botany, mathematics, educational psychology, statistics, general psychology, music and NCC course. It may also be observed from the table that most of the PLMS have been developed in educational psychology.

The PLMS for B.Ed. have been developed by Agrawal (1968), Kaushik (1968), Rastogi (1969), Kamla (1969), Anita (1969), Anand (1970), Bhushan (1972), Chauhan (1972) and Gupta (1973). For the graduate level by Chaddha (1969), Virendra (1970), Gupta (1970) and for the secondary level by Lathe (1968), Bhishm (1970), Mahanand (1971) and Singh (1973). Goel (1970) and Indraj (1972) prepared PLM for the primary level. Some of the investigators have adopted programmes of educational psychology prepared in other countries.

It has been further observed that PLMS have been designed by M.Ed. students, M. Phil. and Ph. D. scholars for primary, secondary, graduate and B.Ed. students. This information has been recorded in Table 2.

Table 2

PROGRAMMED LEARNING MATERIALS FOR DIFFERENT LEVELS

<i>Levels : Programmers</i>	<i>Primary</i>	<i>Secondary</i>	<i>Graduate</i>	<i>B.Ed. Students</i>	<i>Total</i>
M.Ed. students	2	7	2	11	22
M.Phil. scholars	—	4	2	2	8
Ph. D. scholars	—	1	1	3	5
Total	2	12	5	16	35

Table 2 indicates that 22 PLMS have been developed by M.Ed. students, eight by M. Phil. scholars and five by Ph.D. scholars. It may also be noted from the table that two PLMS have been designed for primary, 16 for secondary, seven for graduate and 10 for B.Ed. students. These PLMS are of three types : 26 linear, eight branching, and one mathematics. It is evident that most of the programmes developed are of a linear model.

Kumud (1972) has translated *Programmed Learning : Its Development and Structure* by Patricia Callender in Hindi. Budhi (1973) has translated *Practical Programming* by Piter Pipe in Hindi. These studies have been reviewed into three heads :

- (a) Development of PLM in various subjects and evaluation of their effectiveness.
- (b) Effects of some variables or characteristics related to learner on programmed learning performance.
- (c) Interaction effect of characteristics of learner and strategies of programmed learning.

Effectiveness of the Programme

Many researchers (Kaushik, 1968 ; Agrawal, 1968 ; Bhushan, 1972 ; Chauhan, 1972 ; Gupta, 1973 and others) have found PL superior to traditional method. Some other programmers (Gupta, 1973 and Singh, 1973) have examined the effectiveness with the help of internal criteria and studied other variables. These variables are either related to learners, e.g. age, sex, intelligence, academic achievement, socio-economic status, attitude, etc. or to programme variables, e.g. styles of programming (Singh, 1971), response mode (Gupta, 1973) and prompts (Singh, 1972). The effectiveness of PLM has been evaluated by Gupta (1973) in English grammar on correspondence course students of the university and found it superior to conventional lectures.

Variables Related to the Learner

Negi (1969) found that rural and urban students do not differ significantly in the programmed learning achievement. Singh (1972) concluded that students with high socio-economic status have high achievement on PL.

Lathe (1968) considered sex as a characteristic in PL achievement. She found that boys and girls are equally benefitted by PLM. In another study, Bhushan (1972) inferred that girls' achievement on PLM is higher than that of boys. Again, Singh (1972) found that boys' achievement was higher than that of girls. On the basis of these findings no final statement can be given about sex variables in PL. The contrary findings may be attributable to other factors such as nature of subject and its content.

Verma (1971) in his study found low correlation between age and PL performance. Bhushan (1972) found that younger B.Ed. students scored higher on programmed learning in educational statistics than older students.

Vinod (1969) found that cognitive structure contributes to PL achievement. Goel (1970) found that intelligent students of Class V committed less errors than the students of lower intelligence. Bhushan (1972) also found significant positive correlation between intelligence and post-test scores of PL. He further concluded that pupils of high intelligence took less time in completing the programme.

Some investigators (Kamla, 1969 and Varma, 1971) have studied the effect of previous achievement and attitude towards PLM. Positive correlation was found between pre-test scores and post-test scores, but Negi (1969) found that difference among three groups formed on the basis of attainment in half-yearly examination was not significant. Bhushan (1973) also found that the initial level of mathematics was not significantly correlated with the post-test scores in educational statistics programme. It appears that post-PL achievement is independent to previous achievement.

Girls have greater homogeneity in attitude towards the programmed learning text after completing it, whereas boys showed favourable attitude but greater heterogeneity in achievement. Bhushan (1972) found that post-test scores were significantly correlated with attitude scores.

These findings indicate that pre-test scores have no effect on PL achievement but intelligence, attitude and age seem to have effect on the post-programmed learning achievement.

Effects of Variables Related to Programmed Learning

The prompts, modes of response, types of programme, step size, etc. are related to PL. They have important role in the post-programmed learning performance. Very few investigators have attempted on this aspect of programming.

Some interesting findings were obtained regarding the content and response mode. Virendra (1970) found significant difference between overt-response achievement and covert-response achievement in PL. Gupta (1973) studied the interaction among step size, response mode and taxonomic categories. He found that small step is more effective with covert response and knowledge category, large step is effective with covert response and comprehension and application categories. In this investigation retention in learning was also tested by re-administering the test after fifteen days. The retention by large step and covert responders was found higher than other treatments. The small step and covert responders

seemed to have least retention in learning. Thus, response mode and step size appear to have significant interaction with taxonomic categories.

Verma (1971) studied the effectiveness of linear and branching programming. He inferred that linear programming seems to be more effective at memory level and branching programming appears to be more effective at comprehension level. He also concluded that linear may be followed by branching for better PL achievement.

Singh (1973) designed a study to investigate the effects of formal and thematic prompts on 'map reading' in geography. He further attempted to analyse the interaction effects among prompts, intelligence and taxonomic categories. He found thematic prompts more effective than that of formal prompts on high and average intelligent students. He further stated that thematic prompts seemed to be more effective at comprehension category. The prompts, intelligence, and taxonomic categories appear to have significant interaction. He suggested that prompts appear to be important variable for PL strategy.

Some other researchers have been studying some other variables related to learner and related to programme singly or in combination with other variables in the faculty of education, e. g. schedules of reinforcement, extroversion, rule system and creativity of learner, etc. It may be stated on the basis of the review of studies in PL that the Faculty of Education of the Meerut University has been contributing in the area of programmed learning.

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New Dimensions in Methodology of Research

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General Methods and Tools

RESEARCH in any branch of knowledge can be categorized as historical, correlational, casual, comparative, experimental, survey, case study, or genetic study. They commonly use simple tools like questionnaire, interview, schedule, checklist, rating-scale, sociogram, special ability tests, etc.

All these methods and tools are excellent if employed in the study of a research problem pertaining to a 'specific' subject. How fast a project is completed depends on the complexity or simplicity of the variables selected for the study.

Functional Research

But it is not possible always to employ all these techniques and treatments, especially when the subject is more or less a 'methodology' in its approach. Thereby, certain modifications need to be made in the light

of their nature, philosophy, architecture, anatomy, variables taken for study, etc. in order to make the research more functional and realistic.

As new maths is treated as a methodology, based on an objective sort of learning experiences, a continuous process of study, observation, discussion, experimentation, etc. are to be employed till one arrives at definite conclusions which are general in nature. New maths is a life-long study and so it is in need for the research study in continuously exploring the implicit or explicit nature of the variables of the problem, for new innovations or methods or techniques of teaching.

In the researcher's knowledge, there has been no study directly dealing with the techniques of teaching new maths suited to Indian conditions and environment. To make the research work more realistic and functional, the researcher should take into consideration the school level as well as the environment and surroundings of the students.

Structural Research

Axiomatic treatment, rigorism, logicalism, free use of flow-charts, the matrix of variables and their relationships, selection of reference frames, etc., which form the basis and infrastructure and on which the edifice of the thesis is erected, are *structured* without detriment to statistical treatment made available through the research tools employed.

Historical Research

As the subject, new maths is the one of its kind in India introduced in various schools in the late sixties, newspapers, magazines, and a few books are the only natural sources which can be tapped for the historical development of the subject. They throw light on the new thinking in mathematics education, discussed at international seminars and the new materials produced by experimental groups from time to time. A close scrutiny of these historical facts reveals the true nature of the trend of various cultures prevailing in the society.

Survey Research

The survey method employed in the study of the research problem includes questionnaires, interviews of individuals and groups; observation of books, work-sheets, report cards, teachers' notes, textbooks, classroom behaviour, etc. In all, the surveyor has to chalk out what sort of infor-

mation is needed for relevant contents. The important aspects like the nature of the subject, examination components of the subject, objectives, teaching techniques employed in the learning process, scope of each topic, analysis of textbook, etc. are furnished in different simple information blanks, that are circulated at different sources at mobile learning centres, established by various institutes in collaboration with the researcher, and at schools. The feedback from all these blanks are computerized for data-analysis process and corresponding findings are recorded.

To know the teaching technique followed by different teachers, the investigator sat in some classes for full periods and recorded all activities of teachers as well as students. A record was made and analysed on a five-point scale consisting of seven important elements of observation. The teachers were questioned on a number of activities in connection with the study of maths. Sometimes it so happened that a teacher may paint only a bright picture of himself. To get a realistic picture a cross-section of each student-group was cross-examined. This goes under structured-student group schedule.

All items relating to interviews, students and teachers were faithfully recorded without any subjective bias.

Although the teacher's interview and the students' group interview helped in getting a good deal of information on the teaching techniques and some on written work, it was found that home-work and class-work notebooks were more reliable sources of information on the latter. Several notebooks were collected and studied for regularity of assignment and quality of checking errors, homogeneity, etc. For this purpose simple information blanks were prepared.

Experimental Research

As the nature of new maths differs from the old, the new techniques of teaching evolved on hypothetical grounds are to be experimented upon, at different learning stages, covering the teachers and parent-trainees and educands from kindergarten to higher secondary levels. This includes the age-group 5-66. Different sets of academic pattern selected for study at various inter-disciplinary learning centres of new maths are equated on the basis of the professional work initially, and then they are divided as 'control' and 'experimental' groups at random for further exploration of research findings. After the completion of the orientation course for about a period of four to six months each, a statistical analysis was done on the final performance tests. Adequate care was taken to see that at every stage the control group was taught by the usual methods without

any special techniques. Mostly it was 'chalk and talk'. The experimental group was taught on the basis of new techniques evolved by the researcher. Even the difficulties encountered by experimental group were solved through the same techniques. To find out the impact of the new teaching techniques, the comparative study of pre-tests, and final-tests performances of both the groups were worked out separately. The differences for the control group subtracted from the difference for the experimental group gave the effect of teaching. To make sure of the findings, the methods were repeated at different schools in different classes, covering from Class I to SSC.

Lesson-plans Technique

Apart from this, the researcher has been an active participant in giving lesson-guidance to teacher-trainees for about four to five years to arrive at *generalizations* for these various research findings. Nearly 2,000 lesson-plans were drawn up in various topics of new maths under this scheme and the model lessons were strictly supervised under the personal guidance of the researcher. The five-point rating scale, which is widely used in this context of observation, showed the divergent and convergent aspects of the techniques within the four walls of the classroom and limits of experimental errors. The value of the findings is further enhanced by the necessary modifications at different learning stages. Nearly 500 teacher-educators were trained directly by the investigator to enrich their method of techniques in the light of the new innovations aimed at.

Prescribed Textbooks

Being an author of perscribed textbooks the researcher confidently justifies his project, as he is aware of the different levels of difficulties encountered in putting the fundamental concepts in terms of desirable behavioural changes of pupils aimed at. The feedback mechanism from the user of these books accelerates in conquering the uphill task in modifying the books for future editions. This is what actually happened when information blanks were given to the users and participants at various learning centres and teachers where the books are freely used for different standards. The information blanks contain various minute items relating to the core and non-core material of the book, the flow-chart analysis of topics, unit tests, objectives and their relevant specifications, revision tests, different methods of treatment of the content material, its logical

approach, generalization, etc. As the researcher had developed different styles of writing books under Home-work series, Programmed Learning, Sources, Resource Material, Interaction, Field, Syntheses books covering various aspects of new innovations at different orientation programmes, etc. for different stages of learning, the scope of each topic has been critically examined under experimental situation.

Challenging Situations : Standardization

Of course, debates and challenges with competent authorities, not only enrich one's own knowledge but also make one know one's capacity and capability in terms of one's achievements. As such a series of articles on new maths were published in leading international reputed newspapers and thereby the researcher had an opportunity to have valuable discussions and exchange of ideas with reputed mathematicians through 'letters to the editor' columns. This not only supported his own arguments but also helped evolve new techniques of teaching in the light of different environmental conditions. Such opportunities are essential for the standardization of the achievements at the international level.

Direct Participation

It is easier to give advice to others than to follow it oneself. To know the validity of a truth in a given system, the investigator must directly participate in its analytical survey. Under this project, nearly 10,000 pupils were directly taught by the researcher, thereby the researcher could detect the disadvantages or drawbacks and limitations of each technique employed. They also helped change the course of the implementation process towards the desired direction. The selected medium of instruction was English.

Sincerity of Approach

The sincerity of the researcher in the achievement of a goal is another criterion for finding the solution for his research problem. For this guidance is essential. Suggestions and guidelines given at various stages of development by eminent persons make one march towards achieving one's aims and objectives. Various books written by the author were reviewed by experts of the NCERT and the suggestions thereof perused for the purpose of progressive analysis of the content-material. Apart

from this, certain internationally reputed science journals directly published the reviews on the books written by the researcher. This also helped the author to bring out new revised editions, as well as to see the nature of content in the right perspective. The impact of books written for training college students on new maths, is reflected in the examination results of the trainees or in their day-to-day practice-teaching lessons and finally through the prefaces given by eminent educationists. What more tests are needed? The proof of the pudding is in the eating of it!

Cross-pollination

Cross-exchange of ideas with specialists fertilizes the mind in different colours. This cross-fertility generally occurs in seminars, lectures and workshops, where educationists, eminent mathematicians, students, teachers, parents, and others take an active part in (various) discussions. A number of workshops, seminars and lectures were arranged by the researcher. Acting as a reporter, the researcher jotted down the valuable suggestions and edited them in a systematic way before sending them to the press columns. Overwhelming responses were recorded when such news were published by the leading newspapers. The seminars were conducted at three patterns—elementary, secondary and university level—covering schools, colleges, states, and the nation as a whole. Even the mathematicians of the western countries were invited to take part in these programmes.

Propagation

It is an important part of research in making things understandable, applicable and accessible to a greater number of persons. As a part of the applicative aspect of the research findings, the researcher took up the jobs, as a visiting resource person to different other training colleges and learning-centres to propagate the evolved theories of his techniques. This experience adds one more dimension to the conceptual understanding of the anatomy of teaching new maths. This advantage made the researcher feel more confident of his process of solving problems in the field of maths education, as he was given the opportunity to experience the visiting teachership in different learning centres.

Bridging the Gap

As the body of teaching material in new maths is available to bridge

the gap between elementary and secondary school stages, it is most desirable for a training college teacher to develop the theories of teaching-learning techniques on the same lines to realize the potentialities of maths in a spiral or concentric way, so that each learning experience forms a basis for the promotion towards the subsequent learning stage rather than class-wise promotion. The exhaustive treatment given to each topic and their concentric placement in the curriculum suits Indian settings. The utmost care was taken to set up the treatment of the material accordingly.

Mistakomania

'Dial for doubts', 'open orientation courses' and 'mobile sub-learning centres', 'verification of home-work sheets' and different examinations conducted at various stages, helped much in adding a chapter 'Mistakomania' to the research project.

Flexibility Training

A rigid organization promotes a dogmatic presentation of systems of knowledge. A flexible organization of research work never relies on the old systems of rows of desks facing the teacher. It demands a greater flexibility of the research designs, programmes and methods of survey. In order to keep abreast of the rapid developments taking place in curricula methods, and material for maths teaching, the researcher took an active part in the workshops or seminars conducted by the various associations or organizations, as opportunity offers. The training in microteaching and programmed learning helped the researcher make his things much easier and keep up its trends in pace with the latest developments in teaching-learning techniques.

Final Authority

The subject new maths conceived by western brains infused in our country the desire for the development of creative ability and reasoning faculty. As the originators of the subject are westerners, the final approval of the research findings by the mathematicians all over the world will concretize the situations, where they are to be employed. A few articles of the research subject were given for publications in the *Newsletter* of the British Council, the *TIFR* and overseas magazines.

Colloquium Activities

Last but not the least are colloquium activities, visiting places of interest, study of computer technology, applicative part of new maths at various places like *BARC*, *TIFR*, etc. helped the researcher make his work exhaustive in all directions.

Final Word

This research project is the fruit of all the varied experiences undergone by the researcher from time to time for many years. The researcher has a satisfaction that in an altogether new field and subject, intensive and extensive research could be successfully made if the same pattern of search continues in different dimensions. □

The Impact of Family Planning Programme on School Education

A Study

O. P. VIG

DEPARTMENT OF FAMILY WELFARE

GOVERNMENT OF INDIA

NEW DELHI

The Government of India is implementing the National Family Planning Programme as a part of its developmental strategy so as to reduce the birth rate to 25 or less by 1980-81, and this decline in fertility will result in decline in the school-age population. Its impact on the school enrolments will, however, be maximum at the primary level. It is estimated that about 57-75 million school enrolments will be averted during 1971-91 due to the achievements of the family planning programme resulting in savings in expenditure on the school education, which far exceeds the expenditure on the programme. The study has also revealed that on an average a pupil stays for 6.29 years in the school instead of 12 years, while the wastage due to mortality is about 0.20 years. The wastage in our schools, due to causes other than mortality, is thus about 5.5 years, which is extremely high and calls for immediate remedial measures to plug the drain on our national resources.

MODERN medicine, improved sanitation and nutrition have reduced death rates throughout the world. This has upset the traditional balance between the birth and death rates and resulted in the unprecedented rates of population growth. In India unless the present growth rate is checked, the population of 548 millions in 1971 will more than double itself by the

end of this century. Most of the additional population will, therefore, have to be contended with limited prospects of adequate food, shelter, education and employment.

The Government of India realized the gravity of the situation, particularly after the size of the population for 1951 census became available and enunciated the Family Planning Policy in 1952. Since then the family planning programme has been made a part of the development plans of the country. During the past decades, the family planning programme has passed through diverse facts of organization, planning, implementation and strategy to come to the present mass movement characterized by liberal incentives, intensive campaigns and concentrated efforts. The seriousness of the Government of India¹ will become evident from its declaration to reduce the birth rate to 30 per 1,000 population by the end of the Fifth Five-Year Plan and to 25 by 1983-84. The reduction in the birth rate will check the growth of population, which may benefit various sectors of development, such as, food, housing, education and employment, etc. The impact of the family planning programme on the school education has, however, been considered here.

The increase in school enrolment in India may be mainly due to two causes. The first being the absorption, by the school system, of those children who at one time would not have attended the school. This happens under various circumstances, the most important being the introduction of the system of compulsory education in India since 1950. Its implementation in practice is of course a gradual process, so that over a period of years the school roll increases until eventually all children within the age range defined by the statute start attending school. The second cause is the increase in the size of those age-groups in the general population from which the school population is drawn.

The change in total enrolment may be temporary due to introduction of the system of compulsory education or due to demographic factors when considered over a fairly long period of years; but in either case the implications for the educational administrators are the same: to plan for sufficient number of educational institutions to cater to the maximum number of pupils at any given time. This will include school building

*The author is grateful to Dr. S. N. Agarwala, Director, World Bank Population Project, Lucknow, for his valuable comments and suggestions, and also to Shri R. K. Wason, Analyst, Department of Family Welfare, New Delhi, for his meticulously going through the draft and making useful suggestions. Thanks are due to Messrs S. P. Majumdar and B. B. Vohra for their valuable assistance in computational work and making references available to him. The author is also thankful to the referee for his valuable comments.

¹Government of India, Department of Family Planning, New Delhi, 'Report of the Family Planning Target Setting Committee', 1971, p. 8 (mimeo.)

programme, measures for training enough teachers, provision of all kinds of school equipment, textbooks and other teaching aids, arrangements for examinations, inspections, maintenance of school buildings, and so on.

The making of enrolment projections of the school-age population depends on the trend of changes in the size and age composition of the population of the country. During the past several decades, the population of India has remained quasi-stable, with unchanging fertility and declining mortality resulting in a fixed age distribution.² As a result, the school-age population in the age-group 6-17 years, which is about 28 per cent of the total population, has remained constant during each successive decade since 1901.

The successful implementation of the Family Planning Programme will restrict the growth of India's population, which will check the school-age population. This will help the educational administrators in limiting their developmental activities and will enable them to diversify their resources for further improvement in the school education.

In this paper the impact of India's Family Planning Programme only on the school enrolment during 1971-91 has been attempted and its economic benefits have been estimated by employing life table technique.

ASSUMPTIONS

For estimating the school-age population, the population projections have been made, while considering changes in fertility and mortality only. The net migration of India during this period is assumed negligible. The birth rate is taken as a measure of fertility, while the future mortality trends are assumed in terms of expectation of life at birth for the purpose of projecting the population through survival ratios. The initial population is taken as that of 1971 census, adjusted according to the sex-wise age distribution given by Vig.³ The population is projected by sex in five-year age-groups up to 70 and above, and at five-year interval.

Births Averted due to Family Planning Programme

The increase in female age at marriage, age at widowhood and the family planning programme will affect the birth rate which is taken as a

²O.P. Vig, 'A Study of Population Dynamics of India—1901-71, through Stable Population Technique', unpublished Ph.D. thesis, submitted to Delhi University, 1969, p. 50

³ibid., pp. 121 and 127

measure of fertility. The net effect of the increase in female age at marriage and widowhood on the birth rate is negligible.⁴ The family planning programme is, thus, the only factor which may have a significant effect on the birth rate.

The achievements of the family planning programme may best be considered in terms of the number of births averted. The sterilization, IUCD and conventional contraceptive methods have been considered for estimating the number of births averted due to the family planning programme. The number of births averted during 1971-91 have been worked out under two alternative assumptions explained as under.

Assumption I : The annual targets recommended for the period 1971-79 by the Target Setting Committee⁵ have been assumed to be achieved during each year. For the period beyond 1978-79 for which no targets have been recommended, it is assumed that the tempo of achievements of the programme will be maintained and targets for 1978-79 will continue to be achieved during each year thereafter.

Assumption II : The average achievements during the period 1966-71, in respect of sterilization and IUCD programmes have been 70 per cent and 50 per cent respectively. This rate of achievement is assumed for the targets given under Assumption I. For the conventional contraceptive programme, the achievements of the targets is assumed to be 80 per cent in the first two years, 90 per cent in the next two years and 100 per cent in the subsequent years.

The achievements of the family planning programme, assumed under different assumptions for sterilization, IUCD and conventional contraceptive programme, are given year-wise in Table I of the Appendix.

Since the Government of India made the family planning programme target-oriented for achieving the desired goal in the shortest period some Indian demographers have carried out exercises to estimate the number of couples who will have to become contraceptors in order to achieve the target and the number of births which will have to be averted in order to bring about the desired reduction in the birth rate. The method developed by Agarwala and Venkatacharya⁶ has been used for estimating the number of births averted due to various methods of family planning programme under different assumptions. The estimated number of births to be averted due to various methods of this programme for the period 1971-91 are given in Table 1.

⁴Ibid., pp. 99-100

⁵Government of India, Department of Family Welfare, New Delhi, op. cit., p. 15

⁶S. N. Agarwala and K. Venkatacharya, "A Method for Estimating Annual Births Saved by the Use of Various Family Planning Methods", IIPS, Bombay, August, 1968 (mimeographed)

Table 1

**ESTIMATED NUMBER OF BIRTHS TO BE AVERTED DUE TO VARIOUS
METHODS OF FAMILY PLANNING PROGRAMME DURING 1971-91
UNDER DIFFERENT ASSUMPTIONS**

(in thousands)

Period*	Sterilization		IUCD		Conventional Contraceptives		Total	
	I	II	I	II	I	II	I	II
1971-76	11176	9816	3092	2158	4111	3611	18379	15585
1976-81	19200	13929	5627	2813	7114	7114	31941	23856
1981-86	27148	19078	6573	3287	8306	8306	42027	30671
1986-91	32244	22754	7816	3762	9514	9514	49574	36031
Total	89768	65577	3108	12021	29045	28545	141921	106143

*Achievements of the family planning programme prior to 1971 have been taken into account.

In all, about 106-142 million births may be averted during 1971-91 due to the achievements of the family planning programme in India ; 39-50 million during 1971-81 and 66-91 million during 1981-91. This means that decline in fertility will be quite significant during 1981-91 ; after about thirty years of the introduction of the family planning programme in India, which is in accordance with the observation made by Coale⁷ that "after twenty-five or thirty years declining fertility begins to cause major differences in the growth rate, and later on major differences in the size of the adult population."

Population Projections

The component method has been used for making population projections. The initial age distribution by sex of the population for 1971 as given by Vig⁸ has been assumed for making projections for the period 1971-91, under the following assumptions.

⁷A. J. Coale, "Population and Economic Development", *The Population Dilemma*, The American Assembly, Columbia University, Prentice-Hall, Inc., Englewood Cliff, N.J. 1962, pp. 55-56

⁸O. P. Vig, *op. cit.*, p. 109

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(i) The age specific fertility rates taken from the National Sample Survey⁹, when adjusted to give birth rate of 41.7 for 1961, have been considered for making projections. These are assumed to remain constant and are given in Table 2.

Table 2

ADJUSTED AGE SPECIFIC FERTILITY RATES

<i>Age-group</i>	<i>A. S. F. R.</i>
15-20	143
20-25	260
25-30	241
30-35	187
35-40	127
40-45	49
45-50	17

(ii) The estimates for the expectation of life given by the Expert Committee¹⁰ have been assumed for the period 1971-91, which are given in Table 3.

Table 3

SEX-WISE EXPECTATION OF LIFE AT BIRTH DURING 1971-91

<i>Period</i>	<i>Male</i>	<i>Female</i>
1971-76	50.7	49.3
1976-81	53.2	51.8
1981-86	55.7	54.3
1986-91	58.2	56.8

⁹Government of India, "Fertility and Mortality Rates in Rural India," National Sample Survey, fourteenth round, Report No. 89, Table I, Indian Statistical Institute, Calcutta, 1961

¹⁰Registrar General of India, Government of India, D.O. letter No. 6-1/71-DD dated 25.1.1972

To estimate the fraction surviving each five-year interval, the survivors within age-groups (L_x) have been taken from the Model West Life Tables¹¹ and the fraction surviving from the age-group ($x-x+5$) to ($x+5-x+10$) during a given interval has been taken as $\frac{5L_{x+5}}{5L_x}$. The values of L_x for different values of the expectation of life at birth have been linearly interpolated.

(iii) The sex ratio (male over female births) at birth is assumed as 1.06.

(iv) Net migration has been assumed negligible.

The sex-wise quinquennial age distribution of the projected population is given in Tables II-IV of the Appendix. The population by sex aged 0-5 has been obtained by applying the survival ratio $\frac{0L_5}{510}$ to the number of total births of a given sex.

The total population for India projected for different years under different assumptions is given in Table 4.

Table 4
PROJECTED POPULATION UNDER DIFFERENT ASSUMPTIONS FOR
DIFFERENT YEARS

Year	(in millions)		
	Assumptions		
	Constant Fertility	I	II
1971	547.95	547.95	547.95
1976	616.83	599.88	602.30
1981	700.42	654.14	663.58
1986	802.38	715.60	734.94
1991	919.41	783.57	814.86

The population projections made by the Expert Committee¹² for the period 1971-81, under the assumption of declining fertility are in close agreement with these estimates.

¹¹A.J. Coale, and P. Demeny, *Regional Model Life Tables and Stable Populations*, Princeton University Press, New Jersey, 1966

¹²Registrar General of India, Government of India, op. cit.

School-age Population

The Education Commission¹³ has recommended a common 12-year schooling pattern of primary and secondary education in the country which is given in Table 5.

Table 5

COMMON PATTERN OF PRIMARY AND SECONDARY EDUCATION AS RECOMMENDED BY THE EDUCATION COMMISSION

<i>Level of Education</i>	<i>Standard</i>	<i>Age-group</i>
Lower Primary	I-IV	6-9
Upper Primary	V-VII	10-12
Lower Secondary	VIII-X	13-15
Higher Secondary	IX-XII	16-17

The school-age population has been projected at five years' interval by sex for different levels of education for the period 1971-91, under different assumptions, by using Yeole and Saraswathy's¹⁴ method. The projected population in school ages for different level is given in Table V of the Appendix.

The Education Commission¹⁵ has estimated school enrolment as percentage of population in the corresponding age-group at a five-year interval by sex for the period 1965-66 to 1985-86, which is given in Table 6.

The school-going population has been obtained by multiplying the school-age population with the enrolment ratios. The enrolment ratios for more than 100 have been assumed as 100, and this assumption may somewhat underestimate the school-going population at the lower primary level because children outside the specified age-group are also found undergoing education at this level.

¹³Ministry of Education, Government of India, *Report of the Education Commission, 1964-66, 1966*

¹⁴B.B. Yeole, and P.R. Saraswathy, "On Estimating the School-age Population for Compulsory Education in Some ECAFE Countries", *Indian Educational Review*, Vol. 7, January 1972, pp. 115-122

¹⁵Ministry of Education, Government of India, op. cit., pp. 161-167

Table 6

ESTIMATED ENROLMENT IN PRIMARY AND SECONDARY EDUCATION
BY SEX DURING 1971-91

Level of Education	1970-71		1975-76		1980-81		1985-86		1990-91	
	M	F	M	F	M	F	M	F	M	F
Lower Primary	109.8	68.6	109.0	97.2	110.8	110.7	110.0	110.0	100.0	100.0
Upper Primary	67.7	33.0	81.9	55.7	90.0	90.0	90.0	90.0	100.7	100.0
Lower Secondary	34.2	12.2	40.8	16.9	49.1	22.6	60.4	30.6	76.0	41.8
Higher Secondary	14.6	3.5	17.0	4.8	21.7	7.4	28.8	11.4	38.4	16.7

Table 7

PERCENTAGE DECREASE IN SCHOOL ENROLMENTS DUE TO FAMILY
PLANNING PROGRAMME IN INDIA DURING 1971-91

Level of Education	Assumption	School-going Population (in millions) during 1971-1991		Percentage Increase in School-going Population in 1991 over 1971	Percentage Decrease in School-going Population due to F.P. by 1991
Lower Primary	Without F.P.	48.86	100.10	204.87	
	I	48.86	69.00	141.22	31.07
	II	48.86	76.73	157.04	23.35
Upper Primary	Without F.P.	20.34	66.57	327.28	
	I	20.34	47.91	235.54	28.03
	II	20.34	52.44	257.82	21.23
Lower Secondary	Without F.P.	8.70	32.93	378.50	
	I	8.70	25.09	288.39	23.81
	II	8.70	26.80	308.05	18.62
Higher Secondary	Without F.P.	2.11	10.35	490.52	
	I	2.11	8.40	398.10	18.84
	II	2.11	8.72	413.27	15.75
Total	Without F.P.	80.01	209.95	262.40	
	I	80.01	150.40	187.98	28.36
	II	80.01	164.68	205.82	21.56

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The school enrolment for 1990-91 has been linearly interpolated for the secondary level, and for the primary level it has been assumed that all the children will be studying up to upper primary. The estimated school-going population at a five-year interval by sex for the period 1971-91 for different levels of education under different assumptions is given in Table 6 of the Appendix. It may be seen from this table that at constant fertility, the school enrolments will increase from 69.2 millions in 1971 to 166.7 millions in 1991 at primary level and from 10.8 millions in 1971 to 43.3 millions at secondary level. The increase in enrolments, taking into account family planning achievements, will be from 69.2 millions in 1971 to 116.9-129.2 millions in 1991 at primary level and from 10.8 millions in 1971 to 33.5-35.5 millions in 1991 at secondary level. The school enrolments will, thus, decrease by 20-30 per cent by 1991 due to decline in fertility. The impact of the family planning programme on the school enrolment will be apparent from Table 7.

Table 7 shows that the increase in the school-going population will be maximum at secondary level, while the impact of the family planning programme will be maximum at primary level. In all, about 57-75 millions enrolments are likely to be averted due to the family planning programme by 1991. The figure (p. 79) clearly brings out the impact on school enrolments of the family planning programme for different levels of education.

Cost of Education

The Education Commission¹⁶ has estimated, at constant prices, average annual cost per pupil for the years 1965-66, 1975-76 and 1985-86 for different levels of education, which is given in Table 8.

Table 8
AVERAGE ANNUAL COST PER PUPIL FOR DIFFERENT YEARS FOR
DIFFERENT LEVELS OF EDUCATION

<i>Level of Education</i>	<i>Years</i>					
	1965-66	1970-71	1975-76	1980-81	1985-86	1990-91
Lower Primary	30	41	52	66	80	94
Upper primary	45	66	87	103	119	135
Lower Secondary	107	155	203	236	268	300
Higher Secondary	192	278	363	404	444	485
All Levels	57	86	106	123	142	160

¹⁶*ibid.*, pp. 476-480

The cost per pupil for the year 1970-71 has been taken as mean of the cost given for 1965-66 and 1975-76 and similarly for the year 1980-81. The cost per pupil for the year 1990-91 has, however, been linearly extrapolated. The proportion of pupils for 1965-66 estimated by the Education Commission¹⁷ for lower and upper primary and lower secondary are respectively 0.67, 0.22 and 0.11 which have been taken as weights for working out the cost per pupil for all levels of education. The weight for the higher secondary level has been assumed same as that for the lower secondary level.

Number of Years Spent in School

The life table technique has been used for estimating the number of years expected to be spent by a pupil for completing his school education at various standards.

The radix of the school life table has been assumed as 1,00,000 pupil entering Standard I. Different elements of the school life table are explained below :

I_x . This column gives the estimated number of survivors at each standard. The values in this column are obtained by multiplying the values for each standard by the corresponding adjusted survival rates ' S'_x ' .

s_x . The survival rate ' s'_x ' is the probability of passing from Standard X to X+1. The values shown in the column are the values adjusted for repeaters. The adjustment has been made on the assumption that failures have the same probability of passing as the freshers and that only one repetition has been considered. The remaining pupils are assumed to have discontinued their studies. Then the adjusted survival rate ' s'_x ' is given by

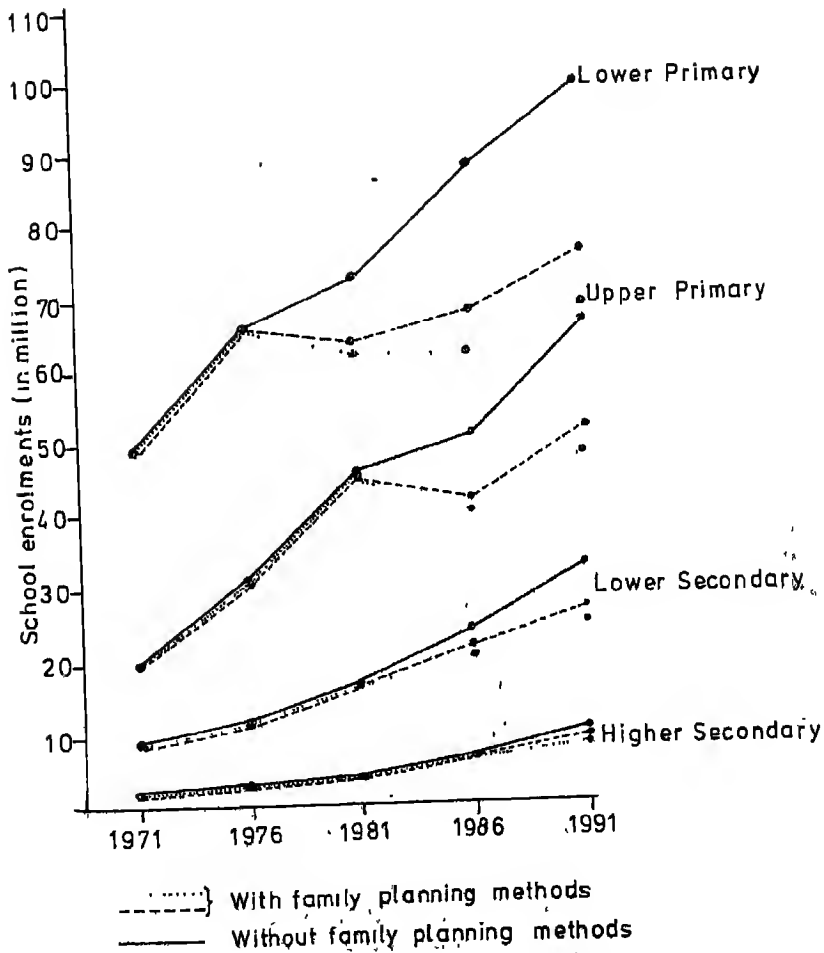
$$S_x = 1 + 2s_x - \frac{2}{2-s_x}$$

The values of s_x used for computation are those given by the Government of Maharashtra¹⁸ for the year 1965-66. It is assumed that these will remain unchanged during 1971-91.

¹⁷Ibid., p. 581

¹⁸Education and Social Welfare Department, Government of Maharashtra, *Educational Development in Maharashtra State*, Bombay, 1968, pp. 99-101

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Estimated School-going Population of India for Different Levels of Education during 1971-91 under Different Assumptions

L_x . This column gives the number of years spent in going to standard $x+1$ from Standard X. The values shown in this column are calculated as $\frac{1}{2} (I_x + I_{x+1})$.

T_x . This column gives the total number of school years remaining to all pupils who are enrolled in school during each standard.

The total number of school years spent by a cohort is simply the sum of school years spent at every standard.

e_x . This column shows the average number of school years remaining to the pupils who are alive at Standard X. This is equal to the total number of school years spent after Standard X, divided by the number

of pupils who survived at that standard, i.e. $e_x = \frac{T_x}{I_x}$.

Table 9

SCHOOL LIFE TABLE FOR THE ENROLLED SCHOOL POPULATION

Standard	S_x	I_x	L_x	T_x	e_x
I	.8767	100000	93835	629385	6.29
II	.6667	87670	73060	535550	6.11
III	.9635	58450	57383	462490	7.91
IV	.9578	56317	52189	405107	7.19
V	.9607	53940	52880	349978	6.49
VI	.9633	51820	50869	297098	5.73
VII	.9650	49918	49045	246229	4.93
VIII	.9784	48171	47651	197184	4.09
IX	.9862	47131	46806	149533	3.17
X	.8521	46481	43044	102727	2.21
XI	.7519	39608	34694	59683	1.51
XII	.6782	29781	24989	24989	0.84

The school life table shows the wastage in school education at different standards, which is about 50 per cent at Standard I. Sinha's¹⁰ life table has been used for working out the expectation of life (e_0^{17}) of pupils entering school at 6 and surviving up to the age 17. The value of e_0^{17} varies

¹⁰Sinha, U.P., 'Complete Life Tables Based on Coale and Demeny's Model (West) Life Tables', I.I.P.S., Bombay (mimeo.)

between 11.73 years for 1970-71 to 11.83 years for 1990-91. This shows that the wastage in school education due to mortality is quite negligible. The wastage is, thus, mainly on account of dropout due to failure and other causes.

Savings due to Family Planning Programme

The savings in the cost of education is a function of (i) number of enrolments averted, (ii) expenditure per pupil per annum, and (iii) time. The time considered is the average number of school years (e_x) remaining to the pupils at Standard X. It is assumed that the values of inputs will remain constant during 1971-91. This assumption will lead to under-estimation of the savings on education due to the family planning programme, the extent of which cannot be safely predicted.

The cohort approach has been used for estimating savings on account of decline in fertility due to family planning. Each lower primary cohort has only been considered for estimating the savings in expenditure on education which are given in Table 10.

It may be seen from Table 10 that the savings in expenditure on education will increase for each successive cohort. This is because the impact of decline in fertility will become more apparent in later years when the number of enrolments averted will also be more because of the cumulative effect. During 1971-91 about 57-75 millions enrolments will be averted resulting in the savings in the expenditure on education to the extent of Rs. 50-65 millions. The savings per enrolment comes to about Rs. 870. The average annual savings during 1971-91 will vary from Rs. 2482.17 millions to Rs. 3237.83 millions which is many times more than the actual annual expenditure* on the family planning programme. The economic gains in the school education due to the family planning programme will, thus, over-compensate the investment on it.

*The expenditure on the family planning programme during 1970-71 was Rs. 054 million.

Table 10

SAVINGS IN EXPENDITURE ON EDUCATION DUE TO FAMILY PLANNING
FOR VARIOUS COHORTS UNDER DIFFERENT ASSUMPTIONS

(Rs. in millions)

Assumption	Cohort for the year				
	1975-76	1980-81	1985-86	1990-91	Total
I	—	9084.72	22229.98	33441.95	64756.65
II	—	7791.15	16725.92	25126.35	49643.42

APPENDIX

Table I

ANNUAL TARGETS PER THOUSAND OF POPULATION FOR VARIOUS
FAMILY PLANNING METHODS TO BE ACHIEVED UNDER
DIFFERENT ASSUMPTIONS

Method : Year/Assumption	Sterilization		IUCD		Conventional Contraceptives	
	I	II	I	II	I	II
1971-72	3.0	2.1	1.2	0.6	7.0	5.6
72-73	3.4	2.3	1.6	0.8	9.0	7.2
73-74	3.8	2.7	2.2	1.1	10.4	9.4
74-75	4.2	2.9	2.2	1.1	12.0	10.8
75-76	4.6	3.2	2.4	1.2	13.0	13.0
76-77	5.0	3.5	2.6	1.3	13.0	13.0
77-78	5.2	3.6	2.6	1.3	14.0	14.0
78-79	5.4	3.8	2.6	1.3	14.0	14.0
79-80	5.4	3.8	2.6	1.3	14.0	14.0
80-81	5.4	3.8	2.6	1.3	14.0	14.0
81-82	5.4	3.8	2.6	1.3	14.0	14.0
82-83	5.4	3.8	2.6	1.3	14.0	14.0
83-84	5.4	3.8	2.6	1.3	14.0	14.0
84-85	5.4	3.8	2.6	1.3	14.0	14.0
85-86	5.4	3.8	2.6	1.3	14.0	14.0
86-87	5.4	3.8	2.6	1.3	14.0	14.8
87-88	5.4	3.8	2.6	1.3	14.0	14.0
88-89	5.4	3.8	2.6	1.3	14.0	14.0
89-90	5.4	3.8	2.6	1.3	14.0	14.0
90-91	5.4	3.8	2.6	1.3	14.0	14.0

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Table II

POPULATION PROJECTION OF INDIA BY AGE AND SEX (1971-91)
UNDER THE ASSUMPTION OF CONSTANT FERTILITY

MALES

(in thousands)

Age-group	1971	1976	1981	1986	1991
0-5	45998	49961	58226	67448	77255
5-10	38048	44559	48178	56608	65947
10-15	33306	37887	44054	47804	56139
15-20	29075	33136	37423	43580	47359
20-25	25128	28733	32533	36820	42968
25-30	21636	24711	28089	31892	36194
30-35	18569	21212	24096	27476	31296
35-40	15872	18111	20589	23473	26867
40-45	13459	15353	17443	19916	23276
45-50	11301	12863	14620	16691	19150
50-55	9284	10602	12029	13747	15786
55-60	7411	8471	9650	11021	12677
60-65	5707	6480	7399	8492	9773
65-70	4089	4676	5309	6122	7096
70+	5057	3038	3482	4003	4669
Total	283940	319793	363220	415093	476452

FEMALES

Age-group	1971	1976	1981	1986	1991
0-5	42427	46587	54421	63436	72557
5-10	37331	40488	44479	52617	61197
10-15	32289	36972	39866	44114	51920
15-20	27748	31960	36373	39507	43495
20-25	23656	27294	31252	35854	38773
25-30	20012	23149	26558	30673	35051
30-35	16870	19501	22440	25978	29894
35-40	14151	16365	18827	21866	25227
40-45	11854	13639	15727	18263	21140
45-50	9848	11371	13045	15160	17544
50-55	8184	9323	10721	12422	14390
55-60	6548	7576	8606	10005	11566
60-65	4963	5841	6752	7766	9022
65-70	3617	4175	4920	5771	6647
70+	4515	2777	3216	3856	4539
Total	264013	297037	337203	387288	442962
Grand Total	547953	616830	700423	802381	919414

Table III
POPULATION PROJECTION OF INDIA BY AGE AND SEX (1971-91)
UNDER ASSUMPTION I

MALES

(in thousands)

Age-group	1971	1976	1981	1986	1991
0-5	45998	41312	42886	46535	51269
5-10	38048	44559	39892	41674	45482
10-15	33306	37887	44054	39481	41313
15-20	29075	33136	37423	43580	39098
20-25	25128	28733	32533	36820	42968
25-30	21636	24711	28089	31892	36194
30-35	18569	21212	24096	27476	31296
35-40	15872	18111	20589	23473	26867
40-45	13459	15353	17443	19916	23276
45-50	11301	12863	14620	16691	19150
50-55	9284	10602	12029	13747	15786
55-60	7411	8471	9650	11021	12677
60-65	5707	6480	7399	8492	9773
65-70	4089	4676	5309	6122	7096
70+	5057	3038	3482	4003	4669
Total	283940	311144	339494	370923	406914

FEMALES

0-5	42427	38288	39828	43259	47681
5-10	37331	40488	36519	38285	41794
10-15	32289	36972	39866	36009	37834
15-20	27748	31960	36373	39507	35557
20-25	23656	27294	31252	35854	38773
25-30	20012	23149	26558	30673	35051
30-35	16870	19501	22440	25978	29894
35-40	14151	16364	18827	21866	25227
40-45	11854	13659	15727	18263	21140
45-50	9848	11371	13045	15160	17544
50-55	8184	9323	10721	12422	14390
55-60	6548	7576	8606	10005	11566
60-65	4963	5841	6752	7766	9022
65-70	3617	4175	4920	5771	6647
70+	4515	2777	3216	3856	4539
Total	264013	288738	314650	344674	376659
Grand Total	547953	599882	654144	715597	783573

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Table IV

POPULATION PROJECTION OF INDIA BY AGE AND SEX (1971-91) UNDER ASSUMPTION II MALES

(in thousands)

Age-group	1971	1976	1981	1986	1991
0-5	45998	42566	46578	51806	57654
5-10	38048	44559	41103	45262	50634
10-15	33306	37887	44054	40679	44870
15-20	29075	33136	37423	43580	40285
20-25	25128	28733	32533	36820	42968
25-30	21636	24711	28089	31892	36194
30-35	18569	21212	24096	27472	31296
35-40	15872	18111	20589	23473	26867
40-45	13459	15353	17443	19916	23276
45-50	11301	12863	14620	16691	19150
50-55	9284	10602	12029	13747	15786
55-60	7411	8471	9650	11021	12677
60-65	5707	6480	7399	8492	9773
65-70	4089	4676	5309	6122	7096
70+	5057	3038	3482	4003	4669
Total	283940	312398	344397	380980	423195

FEMALES

0-5	42427	39449	43257	48160	53620
5-10	37331	40488	37627	41581	46529
10-15	32289	36972	39866	37101	41091
15-20	27748	31960	36373	39507	36635
20-25	23656	27294	31252	35854	38773
25-30	20012	23149	26558	30673	35051
30-35	16870	19501	22440	25978	29894
35-40	14151	16364	18827	21866	25227
40-45	11854	13659	15727	18263	21140
45-50	9848	11371	13045	15160	17544
50-55	8184	9323	10721	12422	14390
55-60	6548	7576	8606	10005	11566
60-65	4963	5841	6752	7766	9022
65-70	3617	4175	4920	5771	6647
70+	4515	2777	3216	3856	4539
Total	264013	289899	319187	353963	391668
Grand Total	547953	602297	663584	734943	814863

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Table V

**ESTIMATED SCHOOL-AGE POPULATION BY SEX FOR INDIA FOR DIFFERENT LEVELS OF EDUCATION
DURING 1971-91 UNDER DIFFERENT ASSUMPTIONS**

Level of Education	Assumption	1971		1976		1981		1986		1991	
		M	F	M	F	M	F	M	F	M	F
		(in thousands)									
Lower Primary	Without FP	30035	29437	35021	32181	38400	35160	44362	41226	51924	48175
	I	30035	29437	35021	32181	32765	29804	32862	29430	35958	33038
	II	30035	26437	35021	32181	33578	30556	35484	32576	39989	36741
Upper Primary	Without FP	20387	19817	23258	22553	26917	24242	29255	27063	34570	32003
	I	20387	19817	23258	22553	26447	23787	23391	21365	24998	22917
	II	20387	19817	23258	22553	26515	23858	24316	22209	27359	25080
Lower Secondary	Without FP	18923	18239	21423	21112	25053	22983	27266	25020	31486	29055
	I	18923	18239	21423	21112	25017	22881	24119	21937	24084	22006
	II	18923	18239	21423	21112	25040	22942	24445	22232	25718	23499
Higher Secondary	Without FP	11783	11265	13382	13032	15311	14653	17454	15862	19262	17708
	I	11783	11265	13383	13032	14970	14607	17067	15478	15665	14260
	II	11783	11265	13383	13032	15289	14642	17076	15486	16260	14801
All Levels	Without FP	81128	78758	93085	88878	105681	97038	118337	109171	137242	126943
	I	81128	78758	93085	88878	99199	91079	97439	88210	100705	92221
	II	81128	78758	93085	88878	100422	91998	101321	92503	109326	100121

Table VI

**ESTIMATED SCHOOL-GOING POPULATION BY SEX FOR INDIA FOR DIFFERENT LEVELS OF EDUCATION
DURING 1971-91 UNDER DIFFERENT ASSUMPTIONS**

(in thousands)

Level of Education	Assumption	1971		1976		1981		1986		1991	
		M	F	M	F	M	F	M	F	M	F
Lower Primary	Without FP	30035	18822	35021	31280	38400	35160	44362	41226	51924	48175
	I	30035	18822	35021	31280	32765	29804	32862	29430	35958	33038
	II	30035	18822	35021	31280	33578	30556	35484	32576	39989	36741
Upper Primary	Without FP	13802	6540	19048	12562	24225	21818	26330	24357	34570	32003
	I	13802	6540	19048	12562	23802	21408	21052	19227	24998	22917
	II	13802	6540	19048	12562	23864	21442	21884	19988	27359	25080
Lower Secondary	Without FP	6472	2225	8741	3568	12301	5194	16469	7656	23929	12145
	I	6472	2225	8741	3568	12283	5171	14568	6713	18304	9199
	II	6472	2225	8741	3568	12295	5185	14765	6803	19546	9823
Higher Secondary	Without FP	1720	394	2275	626	3322	1084	5027	1808	7397	2957
	I	1720	394	2275	626	3248	1081	4915	1764	6015	2381
	II	1720	394	2275	626	3318	1083	4918	1765	6244	2472
All Levels	Without FP	52029	27981	65085	48036	78248	63256	92188	75047	117820	95280
	I	52029	27981	65085	48036	72098	57464	73397	57134	85275	67535
	II	52029	27981	65085	48036	73055	58296	77051	61132	93138	74116

Intellectual Achievement Responsibility

Effects of Organismic Variables, Cultural Differences and Relationship with School Achievement

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The study was designed (a) to investigate the difference, if any, in intellectual achievement responsibility scores of school students in relation to sex and educational level; (b) to find out if the developmental differences reflect significant variations attributable to cultural differences, and (c) to determine the relationship between IAR scores and school achievement. Two hundred boys and 200 girls were randomly selected from eight government high schools located in Bhubaneswar, equally drawn from Class VI through X. The revised version of IAR scale was administered to students in groups of 10. School examination marks in two consecutive examinations were considered for measuring school achievement. Analysis of results using $2 \times 2 \times 5$ ANOVA revealed; Girls had a stronger feeling of internal responsibility than boys; there is a systematic progression of internal responsibility over the educational levels; students attributed responsibility to themselves more in success situations compared to failure situations. Sex \times Scales, Sex \times Class \times Scales, interaction effects were also significant. Comparison of IAR scores between cultural groups showed similarity in IAR scores at comparable age levels. IAR, I+, I- scores of both boys and girls contributed significantly to school achievement. Results were consistent with earlier findings and formulations.

THE importance of reinforcement in learning and achievement has been well demonstrated. Whether the consequences of a piece of behaviour would be regarded as reward, would greatly depend upon the perception and reaction of the individual. The effect of reinforcement depends upon the extent to which the person perceives a causal relationship between the reward and his own behaviour. Some people feel that reward is dependent or contingent upon their own behaviour. There are others who feel that reward or reinforcement is dependent upon outside forces over which they have little or no control. Rotter (1966) explained this phenomenon of terms of locus of control.

Rotter (1966) considered the concept of locus of control as a generalized expectancy operating across a large number of situations. He argued that all human behaviour is a function of the person's expectancies regarding whether his behaviour is leading to getting the reinforcement or not. The past two decades have shown an increased amount of research interest on locus of control of human behaviour or otherwise known as attribution of responsibility (Panda and Lynch, 1971 a). As it now stands, the concept of LC has been understood by researchers in two different context, namely, the generalized expectancies of reinforcements (GE) formulated by Rotter (1966) and the intellectual achievement responsibility (IAR) advanced by Crandall, Katkovsky & Crandall (1965).

Crandall and her associates (1965) argued that attribution of internal responsibility depends upon specific situations and as such the concept of GE is not predictive of achievement in school situations. According to Crandall, *et al.* (1965), a child in school has to show one of the two different feelings. One such feeling may be that his promotion, grades received, and other achievements in academics are due to his own efforts. On the other hand the child may show a fatalistic attitude and feel that his achievements are due to mercy of his teachers, peers and parents.

Predictive validity of the IAR concept for academic achievement has been established by Crandall, *et al.* (1965); Stuck & Wyne (1970); Panda (1971); and deCharms (1972) and in a series of other investigations reviewed by the first author (Panda & Lynch, 1971a). In spite of the compensatory programme, early intervention activities in western and advanced countries, teachers are frustrated when pupils do not accomplish expected academic outcome and the puzzled parents look for alternatives in education. All these demand identification of those factors that seem to contribute to school learning deficits and/or success. The IAR construct, therefore, needs detailed investigation in relation to school achievement. This variable has very rarely been studied in relation to school learning subjects, especially in our setting.

Findings on sex differences regarding attribution of responsibility are equivocal. For example, Penk (1969); Davis & Phares (1969) and Riedel & Milgram (1970) did not find sex differences. On the other hand, Crandall, *et al.* (1965) and Lesiak (1970) showed that girls are more internal than boys. Panda & Lynch (1971 b) reported a study on educable mentally retarded children ($\bar{X}=69.79$ IQ; $\bar{X}=174.41$ months : CA.; N=80) and found boys to be more internal than girls. These findings suggest that the trend of sex differences is different in normal and retarded children and very likely there may be cultural variations. The purpose of this study was to clarify the position and also to see if sex difference shows itself after 11 or 12, the period when children reach the stage of formal operations and logical thinking. Further we are also interested to see if our findings compare in any way to the findings of Crandall and her associates conducted on American children.

PURPOSE

The purposes of the present study were :

- A. To find out the differences in IAR scores in relation to sex and educational level.
- B. To find out if the developmental differences reflect significant variations attributable to cultural differences.
- C. To find out the relationships between IAR scores and school achievement.

The following hypotheses were formulated with regard to various purposes outlined above.

- A-1 Girls will have a stronger feeling of internal responsibility than boys.
- A-2 There will be systematic progression of intellectual achievement responsibility with increase in educational level of pupils.
- A-3 Attribution of responsibility to self will be more in success situations than that in failure situations.
- A-4 There will be significant interaction effects between sex \times scale, sex \times class level, class \times scale, and sex \times class \times scale.
- B. There will be significant difference in the intellectual achievement responsibility scores between an American sample of children and the present sample of children drawn from an Indian background.

INTELLECTUAL ACHIEVEMENT RESPONSIBILITY

- C. There will be significant relationships between each of the IAR measures and school achievement. This hypothesis is same for both boys and girls.

METHOD

Design and Sample

The Ss of the present study were : 200 boys and 200 girls selected randomly from eight government high schools (four boys' high schools and four girls' high schools) located in the capital city of Orissa, Bhubaneswar. The schools were selected randomly from among the existing Oriya medium schools in Bhubaneswar. Then equal number of boys and girls were selected from each class ranging from Class VI through Class X. The high schools follow the same curricula.

Intellectual Achievement Responsibility Scale

The IAR scale (Crandall, Katkovsky, & Crandall, 1965) which was revised by Panda (1971) and adapted for Oriya children, was used in this study to measure attribution of responsibility in intellectual achievement situations. The test includes a number of common intellectual experiences for the school-age children both in home and in school, in the form of 34 forced-choice items of which 17 deal with success experiences and the remaining 17 items deal with failure experiences, thus yielding two subscores, for example :

Item No. 19 (Failure)

When you do not do well at a test, is it because,

- A. the test is especially hard, or
- * B. because you did not study for it?

*Correct answer for internality score

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Item No. 28 (Success)

When you find it easy to work arithmetic or mathematics problems is it usually,

- A. because the teacher gave you especially easy problem, or
- *B. because you studied the book well before you tried them?

The summated score gives the general index of internal beliefs. The higher the score, the greater is the feeling of internal control.

The IAR scale was administered to the children in groups of 10 in a separate room. There was no time-limit for this, but Ss took on the average 45 minutes. The answers were hand-scored and three scores were obtained : IAR total, I+(Success), and I—(Failure).

This scale has very low correlation with IQ (r ranges from .16 to .27 for different samples). The test-retest reliability coefficients are .69, .67 and .69 respectively for the IAR total, I+, and I—scales (all significant at .01). The split-half reliability for the total scale is .76 for the girls and .67 for the boys ($E < .01$).

The validity of the scale has been determined by correlating the test scores with achievement measures. In the original study of Crandall, *et al.* (1965) all achievement test (Iowa test of basic skills) and report card grade point average of girls in grade 3 and 4 were significantly related to I+(all r 's were between .40 and .50) and to I— (all r 's were between .45 and .53). Crandall *et al.*, 1962) further reported validity of the scale by relating the total score to boys' intellectual activity ($r = .70$) and striving for success ($r = .66$). The correlations were significant in both cases. Predictive validity of the test has also been established in a study by Panda (1971). In the present study, an attempt has been made to validate the scale using school achievement in various subjects on the criterion measures. The results are presented in the result section of this paper.

School Achievement

School examination marks in two school examinations were considered for the purpose of finding out the relationships between responsibility and school achievement. The basis for selecting the specific subject-matter area were : (i) the subject-matter in which there would be greater uniformity of marking, i.e. mathematics ; (ii) the subject-matter in which there would be greater variance in marking, i.e. Oriya literature, and (iii) the

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average marks in five main subjects (mathematics, English, social studies, general science and Oriya). These were obtained from the school records.

RESULTS AND DISCUSSION

IAR Scores and Organismic Variables

The IAR scores for total, I+ and I— were calculated for each S separately. The average of the scores and their SDs were then calculated for the 20 groups (i.e. Sex 2 × Class 5 × Scale 2). N in each cell was 40. The measures and SDs are given in Table 1.

Table 1

MEANS AND SDs OF IAR SCORES FOR THE SAMPLE DICHOTOMIZED BY SEX AND EDUCATIONAL LEVEL

Class	Sex	<i>IAR_{tot}</i>		Scores <i>IAR+</i>		<i>IAR—</i>	
		Mean	SD	Mean	SD	Mean	SD
VI	Boys	25.27	3.37	13.67	2.23	11.60	3.09
	Girls	26.95	3.57	13.32	1.36	13.62	1.85
VII	B	26.30	4.18	13.62	1.78	12.67	2.98
	G	27.06	2.41	13.60	2.53	13.48	2.58
VIII	B	26.20	4.37	13.38	2.36	12.82	2.64
	G	27.72	2.94	13.75	1.97	13.97	1.72
IX	B	27.28	3.81	13.68	2.02	13.60	2.29
	G	28.78	2.74	15.05	1.41	13.72	4.06
X	B	26.58	3.55	13.55	1.56	13.02	3.27
	G	28.02	3.23	14.42	2.01	13.60	2.10

N in each group is 40

A 2(Sex) × 5(Class) × 2(Scales) analysis of variance was computed with repeated measure on the scales. The raw scores on the IAR test provided the basis for the F-test. The results of the F-test are presented in Table 2.

Table 2
SUMMARY OF ANALYSIS OF VARIANCE

Source	df	MS	F
<i>Between Ss</i>			
Sex	1	95.362	17.300 **
Class	4	20.120	3.650 **
Sex \times Class	4	1.059	<1
Error _b	390	5.512	
<i>Within Ss</i>			
Scales	1	67.362	17.882 **
Scales \times Sex	1	114.811	30.451 **
Scales \times Class	4	3.699	<1
Scales \times Class \times Sex	4	11.582	3.074 *
Error _w	390	3.767	

** P < .01 * P < .05

The F-ratio for Sex 17.300 (df 1, 390) is significant at .01 level. From entries in Table 1, it is observed that the overall mean pooled over classes and scales for boys is 26.325 and that for girls is 27.710. Obviously, girls have a stronger feeling of internal responsibility than boys. This is quite in tune with the findings reported in the original study of Crandall and her associates (1965). This suggests that the pattern of sex differences in attribution of responsibility are similar across cultures but for a valid generalization, studies on different cultures are imperative.

On the basis of the theoretical formulation of the construct, it was conceptualized that there would be systematic progression in attribution of self-responsibility as boys and girls progress in their educational attainment. The observed F-ratio for the class variables is 3.650 (df 4, 390) is significant at .01 level. The mean IAR_{tot} scores for Class VI through Class X were respectively 26.11, 26.96, 28.25, 27.30. It is clear that there is an increase in internal feeling from Class VI through Class IX. The Sex \times Class interaction is not significant.

Crandall and her associates stated that responsibility scores will be differently related to failure and success experiences in school situations. In the present study, success and failure scores have been analysed separately. The obtained F for scales 17.882 is significant at .01 level (df 1, 390). The means for responsibility for success and failure are respectively 13.805 and 13.212. This suggests that children attribute responsibility to themselves more in success situations compared to failure experiences. Interestingly

enough, this finding is similar to that of Crandall (1965) using normal children, for negro and white children (Garrett & Willoughby, 1972); and for low IQ children (Panda, 1970; 1971a). One explanation seems plausible that in the life of children, success situations build up greater personal responsibility compared to failure situations which are frustration producing (Cromwell, 1963).

The sex \times scale interaction is significant ($F=30.451$, $df=1$, 390 $P<.01$). The mean responsibility scores for boys are 13.58(I+), and 13.68(I—). Apparently, the magnitude of difference between the boys and girls is more for the failure orientations (I—) than the success orientation (I+). Girls in contrast the boys do not shift responsibility to other sources of causations in failure situations of academic life as often as boys. A similar trend can be observed in the 1965 study of Crandall and her associates although the interaction effect was not calculated in that study.

The second-order interaction between sex \times class \times scale is significant at .05 level. An examination of the entries in Table 1 revealed that for boys the IAR— scores are much lower than that of IAR+ scores at each class level. For girls the IAR+ scores are higher only in Classes IX and X than the IAR— scores.

Cultural Differences

One of the purposes of the study was to compare the IAR scores obtained in the present study to that of Crandall's study conducted on American children. The basis of comparison is rather exploratory. For this purpose, extracts from Crandall's study and our own data are given in Table 3 along with t-values.

It was the presumption while planning for this comparison that Indian children would be more fatalistic by nature compared to American children who are supposed to be independent minded. None of the t-ratios reached the significant level. Only in the Class X, our girls students appeared to be relatively more internal compared to their American counterparts. We simply note this finding without further interpretation.

Research on this topic is underway in our department which will highlight the socio-cultural differences, if any, in IAR. However, it would be appropriate to conclude that attribution of responsibility follows almost a uniform trend with little cultural variation and the intensity of such responsibility at comparable age levels remains fairly equal.

Table 3

SIGNIFICANCE OF DIFFERENCE IN IAR SCORES BETWEEN AN AMERICAN SAMPLE AND H SAMPLE FROM ORISSA

Source	Score Description	N	Orissa sample		N	American sample		t
			Mean	SD		Mean	SD	
Boys	IAR _{tot}	40	25.27	3.73	93	24.74	4.57	0.69
Class VI	I+	40	13.67	2.23	93	12.99	2.54	1.58
	I—	40	11.60	3.09	93	11.75	2.79	0.26
Girls	IAR _{tot}	40	26.95	3.57	73	26.93	3.71	0.21
Class VI	I+	40	13.32	1.36	73	13.88	2.21	1.75
	I—	40	13.62	1.85	73	13.05	2.43	1.41
Boys	IAR _{tot}	40	26.20	4.37	68	25.38	3.51	1.01
Class VIII	I+	40	13.37	2.36	68	13.07	1.97	0.71
	I—	40	12.80	2.64	68	12.31	2.83	1.67
Girls	IAR _{tot}	40	27.70	2.94	93	26.64	3.86	1.74
Class VIII	I+	40	13.75	1.97	93	13.27	2.35	1.27
	I—	40	13.97	1.72	93	13.38	2.27	1.64
Boys	IAR _{tot}	40	26.58	3.55	90	25.27	4.62	1.78
Class X	I+	40	13.55	1.56	90	13.13	2.60	1.13
	I—	40	13.02	3.27	90	12.13	2.83	1.50
Girls	IAR _{tot}	40	28.02	3.23	93	26.50	3.93	2.38*
Class X	I+	40	14.42	2.01	93	13.29	2.22	2.87**
	I—	40	13.60	2.10	93	13.22	2.40	0.47

* P < .05 ; ** P < .01

IAR and School Achievement

The third and the major purpose of this study was to find out the relationship between children's achievement in schools. It was planned to analyse the relationship separately in relation to the total achievement responsibility, responsibility for success and responsibility for failure. These proposed relationships were computed for each class, sex-group and school-subjects separately.

Table 4 presents the coefficients of correlations between IAR scores and school achievement of boys reading at different grade-levels.

INTELLECTUAL ACHIEVEMENT RESPONSIBILITY

Table 4
COEFFICIENTS OF CORRELATIONS BETWEEN IAR SCORES AND
SCHOOL ACHIEVEMENT FOR BOYS

Class	IAR Scores	Oriya	Maths	Total Achievement
VI	IAR _{tot}	.397*	.273	.291
	I+	.206	.131	.383**
	I—	.785**	.266	.098
VII	IAR _{tot}	.570**	.587**	.168
	I+	.465**	.384**	.906**
	I—	.555**	.446**	.627**
VIII	IAR _{tot}	.624**	.503**	.294
	I+	.437**	.187	.318*
	I—	.159	.259	.149
IX	IAR _{tot}	.685**	.528	.297
	I+	.627**	.242	.292
	I—	.492**	.193	.150
X	IAR _{tot}	.474**	.663**	.577**
	I+	.477**	.160	.472**
	I—	.180	.413**	.891**

*P < .05

** P < .01

df=N-2,

N=40 in each case

An examination of the correlations of the coefficients reveals the following. There is a significant positive relationship between achievement responsibility and achievement in Oriya and mathematics with one exception for mathematics in Class VI when the r is not significant. Lack of relationship between IAR and total school achievement may lead one to infer if one of the two sub-scales is related to it while the other is not. Analysis of the correlation coefficient between I+ and school achievement shows that on the average boys' feeling of responsibility for success influenced their achievement in Oriya. Unfortunately responsibility for success is tangentially related to achievement in mathematics whereas its relationship with total achievement is fairly high.

Looking at the correlation coefficient between I— and school achievement, it seems that responsibility for failure contributes only moderately to achievement in schools. In general, IAR total seems to influence specific achievement, IAR for success seems to influence both specific and general achievement, and IAR for failure is only slightly related to both specific and general achievement.

Table 5 presents the correlation coefficient between IAR scores and school achievement for girls reading at different grade levels.

Table 5
COEFFICIENTS OF CORRELATIONS BETWEEN IAR SCORES
AND SCHOOL ACHIEVEMENT FOR GIRLS

Class	IAR Scores	Oriya	Maths	Total Achievement
VI	IAR _{tot}	.593**	.292	.473**
	I+	.520**	.157	.672**
	I—	.620**	.813**	.293
VII	IAR _{tot}	.412**	.192	.529
	I+	.536**	.613**	.510
	I—	.526**	.292	.492**
VIII	IAR _{tot}	.783**	.184	.178
	I+	.410**	.196	.196
	I—	.236**	.123	.154
IX	IAR _{tot}	.512**	.192	.486**
	I+	.474**	.633**	.877**
	I—	.593**	.242	.197
X	IAR _{tot}	.792**	.293	.427**
	I+	.515**	.372*	.752**
	I—	.810**	.252	.188

*P < .05
df = N — 2

**P < .01
N = 40 in each case

Entries in Table 5 showed that IAR total score among girls is related to achievement in Oriya and total achievement ; but its relationship with mathematics achievement scores is insignificant. IAR+ correlated highly and significantly with achievement in Oriya and total school achievement. The relationship between IAR for success and mathematics achievement is only significant at Classes VII, IX and X but not at Classes VI and VIII. Quite interestingly, girls' responsibility for failure, like that of the boys' is significantly related to their achievement in Oriya but very slightly related to mathematics achievement and total achievement. In general, it seems more appropriate to state that the IAR for success as well as for failure in the case of girls tend to influence their achievement in Oriya.

INTELLECTUAL ACHIEVEMENT RESPONSIBILITY

The findings of the present studies do suggest that attribution of responsibility in intellectual achievement situations is quite significant in influencing school achievement. One obvious implication of the study, therefore, would be to design some intervention programme so that it would be possible to increase the internality in children to enhance school achievement. In fact, an intervention programme has already been designed and the results will be reported in a future report.

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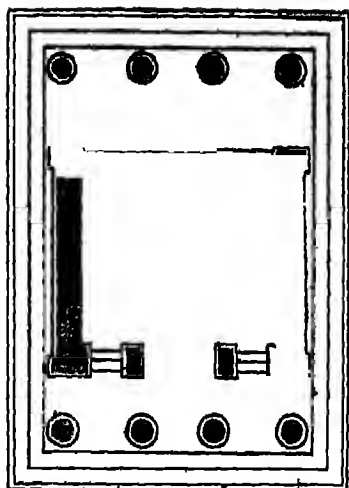
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A Clinical Test of Memory

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INTRODUCTION

MEMORY is one of the important cognitive functions of living organism. The division of memory can be done in two ways : (a) short- and long-term memory, (b) memory of non-verbal and verbal material. Clinically, it is classified into remote, recent and immediate functions.

Three methods are used for measuring memory : (a) method of recall, (b) method of recognition, and (c) method of saving and reconstruction. In clinical practices, it is the method of recall which is used most widely. But memory being a complex phenomenon cannot be measured with a test or two. Rather, we need to have a battery of test for this purpose.

The concept of memory was known to man since time immemorial but the first systematic and experimental work in this field was done by

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Ebbinghaus (1850-1909). In 1917, Hull stated that when we talk of memory we are concerned with only one thing and that is the output or the reproduction of the learned material which is too imprecise. According to Crafts, Schneirla, Robinson and Gilbert (1950) memory is the "Knowledge of an event, or fact, of which meantime we have not been thinking, with the additional consciousness that we have thought or experienced it before".

Theories of Memory

The Trace Decay Theory of Memory is based on Thorndike's (1913) law of disuse. The Interference Theory, developed by McGeoch, came into existence as a revolt against the Trace Decay Theory. The Permanency Theory has drawn its strength from the Freudian Theory. Here unpleasant memories are said to be pushed back below the surface of recall. These memories can be brought to the conscious level, lifting the inhibition through the methods of free association, dream interpretation, and hypnosis.

Systems of Memory

Some theorists believe that there exist two separate memory compartments, one of which controls memory over short period (short-term memory—STM) and the other over longer periods (long-term memory—LTM). Apart from experimental evidences there are clinical evidences also for compartmental system (Baddeley and Warrington, 1970, 1973; Milner, 1966, 1968; Wickelgren, 1968, etc.). No transfer from STM to LTM was found in the studies where surgical penetration into the hippocampus was necessary.

Multi-compartmental View

Norman (1970) emphasizes that there are three different types of memory storages : (i) a sensory information storage, (ii) a short-term memory, and (iii) a long-term memory. Wickelgren (1970) has named them as very short-term memory (VSTM), short-term memory (STM) and long-term memory (LTM). He believes that there is an intermediate term memory (TMM) also and each trace in each modality passes through four phases—acquisition, consolidation, decay and retrieval. Lately, storage model of memory met a severe criticism by various researchers. Clinical studies do support the existence of two different types of memory.

Nature of Material

The material used for memory studies have been classified in three categories : (i) Meaningful and non-meaningful, (ii) Verbal and non-verbal material and (iii) Sex-related material. It is generally accepted that (a) mostly the meaningful, (b) both verbal and non-verbal material, and (c) the material free from any sex-related pursuits as far as possible should find a place in any good measure of memory.

Relationship with Age, Education and Mental Illnesses

Majority of researchers, clinicians and physiologists believe that memory like other mental faculties is generally attained around the chronological age of 20 years. Then it remains almost static up to 40-45 years of age and then it declines. The investigator, however, states that there is no conclusive evidence regarding decline in memory functioning involved in rote memory, orientation and digit span. Any good measure of memory is expected to show the older age-group (above 50 years) to perform poorer as compared to the younger controls.

There are no direct evidences of the type of relationship between memory and education but indirect evidences show that education has a strong bearing with psychological test scores.

Numerous studies throw light on the relationship of memory on the one hand and mental diseases or illnesses like psychoneurosis, effective illnesses, schizophrenia, etc. on the other. It is believed that schizophrenics do better than organics but poorer than normals. Because of the lack of evidence no prediction can be made about the functioning of memory in case of neurotic illness.

Memory Tests

The memory tests can be divided into two categories : (i) those which are comprehensive test batteries, and (ii) those which measure only one aspect of memory. Under the first category comes the earliest test under the heading 'A method of memory examination suitable for psychotic cases', developed by Wells and Martin in 1923 (Indian adaptation of this test is known as Boston Memory Scale). Another test in this group is known as Wechsler Memory Scale. Some of the tests are being developed by western workers on these lines. The tests which come under the second category are Memory for Designs Test (Graham and Kendall, 1946), Cattell's (1948) Memory Tests, Paired Associate Learning Test

(Inglis, 1959), Benton's Visual Retention Test (1963), the Synonym Learning Test (Kendrick, *et al.*, 1965), the Names Learning Test (Irving, Robinson and McAdam, 1970), and Digit Span Test. In India, Boston Memory Scale, Wechsler Memory Scale and Benton's Visual Retention tests are frequently used in clinical practice of memory measurement as well as in the psychiatric psychological researches.

Various Sub-tests and their Utility

Remote personal data, etc. test has been a part of many test batteries. In clinical examination of memory, items pertaining to personal data—remote, recent and orientation—are routinely asked. The importance of this data in memory test batteries is probably undisputed. The Digit Span Test and tests of Mental Balance have been found more useful in memory studies.

Items pertaining to general and current information, serial reproduction, paired associates learning have been included in test batteries. Non-verbal tests of memory are also available.

TEST CONSTRUCTION AND
STANDARDIZATION

The purpose of the present study is to construct and standardize a test of memory. A number of terms, viz. test, measurement, standardization, norms, practicability, reliability, validity and cross-validation, used by other researchers, have also been used.

The aims of the present study were :

1. To construct a test of memory in Hindi which is less loaded with general intelligence and is suitable even for less educated and unsophisticated subjects.
2. To standardize it on psychiatric population.
3. To find out reliability of the test.
4. To find out its validity.
5. To provide tentative norms and a memory profile chart.

MATERIAL AND METHODS

Overall Design

While constructing the present test of memory suitable for the clinic population and the clinical purposes, the guidelines given below were followed :

1. The concept of memory for the present study was defined as the ability to retain and reproduce impressions once perceived.
2. Meaningful material was used in the test.
3. The material was kept simple as far as possible so that even illiterate and unsophisticated subjects, who constitute the bulk of clinic population, could comprehend it with relative ease.
4. Different types of sub-tests were formed with a view to obtain comprehensive assessment of memory. These were : remote memory, recent memory, mental control (mental balance), attention-concentration, delayed recall, sequential recall, paired associate learning, visuomotor reproduction and recognition.
5. Adequate time intervals for sub-tests measuring retention, varying from seconds to minutes, were evolved.
6. Test-retest reliability was determined.
7. Validity was established by testing the following hypotheses :
 H_1 —that organics would obtain lower scores as compared to psychotics and neurotics.
 H_2 —that older subjects (aged 50 years and above) would obtain lower scores as compared to younger ones (aged between 20 and 45 years).
8. Standardization sample was selected from amongst the psychiatric patients who visited the Department of Psychiatry of Nehru Hospital attached to the Postgraduate Institute of Medical Education and Research, Chandigarh.
9. The normal subjects were taken from amongst the attendants of the psychiatric patients.
10. The four groups of organic, psychotic, neurotic and normal cases were adequately matched for various levels of education and sex, so as to find out interaction of these factors on scores, if any.
11. Quintile norms (N/5) were prepared.

Control

AGG. In the standardization and pre-standardization stages, only those

cases were taken, who had attained the age of 20 years but were not more than 45 years.

INTELLIGENCE. Only those cases who were clinically judged to have average or near-average intelligence premorbidly, were taken.

AREA OF DOMICILE was group matched in the four groups as well as in the male/female distribution of the cases.

For the remaining relevant factors, a $4 \times 3 \times 2$ factorial design was followed, so as to study three factors simultaneously, i.e. diagnosis, education and sex.

POPULATION. For the purpose of this study, population was defined as those adult cases who fulfil the following criteria and have visited the Psychiatry Department of Nehru Hospital :

- (i) Those who had attained the age of 20 years but were not more than 45 years.
- (ii) Those who had first episode of psychiatric illness.
- (iii) Those who had average functioning intelligence as judged clinically by the attending psychiatrist during detailed work-up of the cases.
- (iv) Those cases where there was no dispute about the broad psychiatric diagnosis. (The results of psychological testing including this test were not used in arriving at final diagnosis).
- (v) Those who were cooperative and were amenable to psychological testing, and could understand simple spoken Hindi.

Sample

The sample for the study was collected from the Department of Psychiatry, Postgraduate Institute of Medical Education and Research, Chandigarh. The cases fulfilling the criteria stated earlier, were included in the sample. Only those cases, who were worked up by the Senior Psychiatric Residents and were later seen by one of the three consultants, were taken. Selection of cases was not made on assumption, except for the required criteria as laid down earlier. More or less, all the consecutive cases seen by Senior Residents were included. The organic group contained those cases also who were referred by the Neurology Department for psychiatric consultation. The normals and older cases were those who fulfilled the requisite criteria and volunteered to take the test. Apart from psychiatric groups, two control groups of normal volunteers were also taken. The total number of cases studied under various groups are given in Table 1.

Table 1

NUMBER OF CASES STUDIED UNDER VARIOUS GROUPS

Samples	Older Normal	Adult Normal	Neurotic	Psychotic	Organic	Total
Tryout	—	—	21	21	21	63
Standardization	—	90	90	90	90	360
Construct Validity	50	—	—	—	—	50
Cross Validity	—	53	—	—	—	53
Total	50	143	111	111	111	526

Note: $4 \times 3 \times 2$ (diagnosis, education and sex) factorial design was followed for standardization sample only.

Test Construction

The main source of selection of items was the clinical practice of memory evaluation. Besides this the comprehensive as well as isolated memory tests, coupled with some of the experimental models of memory testing were also used for taking help in test construction.

Procedure for Sample Selection

The total number of cases studied for the purpose of standardization were 360, equally divided into four groups—normal, neurotic, psychotic and organic. Each of these four groups had six sub-groups, each comprising equal number of cases, i.e. 15 in each sub-group. In all, there were 24 combinations and each combination required 15 cases to fit into the factorial design of $4 \times 3 \times 2$ as given in Table 2.

Table 2

NUMBER OF CASES IN EACH COMBINATION OF
 $4 \times 3 \times 2$ FACTORIAL DESIGN

Education in Years	Sex	Normal	Neurotic	Psychotic	Organic	Total
O—V	M	15	15	15	15	60
	F	15	15	15	15	60
VI—IX	M	15	15	15	15	60
	F	15	15	15	15	60
X and above	M	15	15	15	15	60
	F	15	15	15	15	60
Total		90	90	90	90	360

STANDARDIZATION. The standardization study was started in July 1973 after completing the test construction and having tried it out on the psychiatric cases.

REPEAT TEST. In 40 cases the test was repeated after a period of one week for test-retest reliability. Only those cases were repeatedly tested where either active treatment was not yet started or where no significant obvious change in their mental status was noted.

CONSTRUCT VALIDATION. Construct validity was established in the following two ways :

1. For establishing the association with old age, a comparable sample of normal persons above 50 years of age was taken. Their memory scores were compared with those of the younger age-group in the standardization sample. The hypothesis formulated was that memory declines with age.
2. For correlating the memory scores with the intelligence test scores, 80 cases (20-45 years of age) were taken. They were administered Bhatia Battery-short Scale in addition to the memory test being standardized.

CROSS VALIDATION. An extra sample of 53 normal volunteers was obtained. These cases belonged to the group of 10 years or more of schooling, and comprised males and females.

CONCURRENT VALIDATION. Two memory tests—Boston Memory Scale and Wechsler Memory Scale—were administered on 25 subjects each. These were unselected cases from amongst those who could understand and speak English. Boston Memory Scale was administered on mixed group of cases. The administration of two tests (present memory test and any one of the two scales) was done in ABBA sequence with the result that in 50 per cent of the cases present memory test followed the existing memory scale and in 50 per cent cases it preceded the existing memory scale and in 50 per cent cases it preceded the existed scale. This was done to minimize the position effect, if any, which might have crept in otherwise.

Statistical Procedures

ITEMS ANALYSIS. Criterion group validity of each item was determined through chi-square test of significance.

SUB-TEST ANALYSIS. To evaluate the significance of performance of normal, neurotic, psychotic and organic cases, analysis of variance was ..

computed separately for each sub-test. This technique was used because of the very nature of the design adopted.

MULTIPLE COMPARISON. Analysis of variance can give information about significant differences among groups ; but it cannot tell which of the two differences were significant. To determine this, Duncan's (1955) Multiple Range Test, as also advocated by Edwards (1971), was used.

In the present design, there were three factors—diagnosis (4 levels), education (3 levels) and sex (2 levels). Here, the problem of multiple comparison was faced for diagnosis and education only. The values (sums of squares) obtained by the three-way analysis of variance ($4 \times 3 \times 2$) were converted into the one-way analysis of variance, separately for diagnosis and education levels.

RELIABILITY. The test-retest reliability for each sub-test was determined by using Pearson's Product Moment Method of Correlation. Mean difference was evaluated by t-test, using method for correlated means. Since the normal and neurotic groups did not show any significant difference in their mean performances on any of the sub-test, these two were combined together for testing the reliability. Psychotic and organics were combined together as a deviant group for the same purpose because they were different from the normal control groups.

CONSTRUCT VALIDITY was determined by finding the significance of mean differences by t-test between younger and older groups of cases which match for sex and education.

WHOLE TEST. The test-retest and the split-half (odd-even sub-tests) reliabilities were determined, using Spearman's and Pearson's correlation methods, respectively. The calculated r for the split-half reliability was converted into full-length reliability, using Spearman-Brown formula. To determine the internal consistency of the sub-tests, correlation matrix was prepared and an Elementary Linkage Analysis (McQuitty, 1957), which is a rapid and objective method for clustering variables into types, was performed to find out the number of clusters.

VALIDITY. Concurrent validity against the existing memory tests was determined through coefficient of correlation (r) between raw scores of the two tests (Present Memory Test—Boston Memory Scale ; and Present Memory Test—Wechsler Memory Scale). Construct and cross validities were determined by finding out the significance of mean difference by t-test.

NORMS. This test was constructed chiefly for use in clinical practices where an individual person who takes the test, is more important. Therefore, in the present study, it was thought desirable to prepare percentile norms, for each sub-test separately for the different groups where signifi-

cant differences were noted. Since the range of scores was narrow, instead of centile or decile, quintile (N/5) norms (Freeman, 1965), were prepared.

TEST CONSTRUCTION*

The sub-tests included in the present battery are : (1) Remote Memory, (2) Recent Memory, (3) Mental Balance, (4) Attention and Concentration, (5) Delayed Recall, (6) Immediate Recall (sentence reproduction), (7) and (8) Verbal Retention for Similar and Dissimilar Pairs, (9) Visual Retention Task, and (10) Recognition Task.

The manuscript was shown to ten professionals for their opinion. The major suggestion that came from some of them (though not undisputed) was to give some interpolated task to fill the interval period on the sub-tests of retentive recall. The first tryout was done on 20 psychiatric patients. The difficulties were discussed and as a result of this the interpolated activity was avoided.

Administration

Each item of Sub-tests 1 and 2 was read distinctly and slowly at a steady rate. If the subject failed to understand the item, it was repeated. For Sub-test 3, time taken and errors/ommissions made by the subject on each of the three items were noted.

Digits of Sub-test 4 were read out at a steady rate, following the traditional rate of one digit per second. The tester was careful not to accentuate any of the digits or introduce rhythm. Testing was started with the shortest list to the progressively longer sequences until a length was reached at which the subject failed on both the sets of the same length of digits. If the subject successfully repeated any single set, then the second set of the same length was not given.

For Sub-test 5, the words of lists were also read at a steady rate of one second each. Two separate trials were given irrespective of whether the first list was correctly recalled or not, after the expiry of one-minute post-exposure period, observed silently. For Sub-test 6, each of the sentences was presented one by one to the subject for immediate reproduction. Each sentence was read out slowly, distinctly and at a uniform rate during presentation.

*Since the test is in Hindi, it is not possible to reproduce it here.

For Sub-tests 7 and 8, detailed instructions and procedures were as laid down in the test. If the subject used a semantically similar but acoustically different criterion response then he was requested to use only those criterion words which were actually used in the test. For Sub-test 8 repeat trials were made and thus there was some difference in its administration.

For Sub-test 9, the subject was asked to be attentive before the first card was presented. After 15 seconds, the card was removed and it was followed by a 30-second post-exposure period, observed silently.

For Sub-test 10, a figure, containing 10 designs, was exposed for 30 seconds and then a post-exposure rest-pause of 120 seconds was observed silently. After the rest period, another figure, containing 20 designs, was exposed. The subject was required to identify and name the objects present in both the cards.

RESULTS

The number of cases taken up for the final study was 360. These persons were divided into four groups—normal, neurotic, psychotic and organic. The mean values of age for these groups were 32.77, 31.81, 31.21 and 30.85 with SDs of 8.12, 7.50, 8.35 and 8.32, respectively. The distribution of cases belonging to urban and rural areas did not differ significantly among the four groups.

Diagnosis

The diagnostic break-up of neurotic, psychotic and organic cases was done according to the International Classification of Diseases and is shown in Tables 3, 4 and 5.

Table 3
DIAGNOSTIC BREAK-UP OF NEUROTIC CASES
(ICD Code 300)

(300.0)	Anxiety neurosis	37
(300.1)	Hysterical neurosis	11
(300.3)	Obsessive compulsive neurosis	13
(300.4)	Depressive neurosis	14
(300.9)	Other and unspecified neurosis	15
Total		90

Table 4

DIAGNOSTIC BREAK-UP OF
PSYCHOTIC CASES

(ICD Code 295 to 298)

(295)	Schizophrenia	63
(296)	Affective psychoses	23
(298)	Other psychoses	4
Total		90

Table 5

DIAGNOSTIC BREAK-UP OF ORGANIC CASES

(291)	Alcoholic psychosis	2
(292)	Psychosis associated with intercranial infection (GPI, encephalitis, etc.)	7
(293)	Psychosis associated with other cerebral conditions (Head injury, tumor, cysts, etc.)	15
(294)	Psychosis associated with other physical conditions (Child birth, fever, endocrine, metabolic and nutritional disorders)	21
(309)	Non-psychotic organic brain syndrome (Head injury, tumor, infections, etc.)	27
(344)	Epilepsy	18
Total		90

Note : The numbers in parentheses in Tables 3, 4 and 5 refer to code numbers according to WHO International Classification of Diseases

Remote Memory (Sub-test I)

The result indicated that each item had significant criterion validity and could differentiate the organic group from rest of the categories of patient. The analysis of variance showed that the scores of four groups of cases were significantly different and scores were also shown to be dependent on years of schooling of the subjects. However, sex did not show any effect on the scores. None of the interactions was found to be statistically significant. Further, normals and neurotics did not differ in their mean scores, but both organics and psychotics were found to be significantly different from each other and from the normals and neurotics.

Recent Memory (Sub-test 2)

Results indicated that each of the items of this sub-test had discriminating value. The overall score showed that there was no significant difference between the scores of males and females. However, significant differences were found among the diagnostic categories and three levels of schooling. Among the four diagnostic categories, all groups differed with each other, with the exception of normal *versus* neurotic group difference, which was found to be non-significant. Educationwise, up to five years of schooling group differed significantly from '10 and above' years of schooling group only. Except for diagnosis, and schooling interaction, all other interactions were found to be statistically not significant.

Mental Balance (Sub-test 3)

Results indicated that each of the three items could significantly differentiate among the four groups of cases. The performance of organic group was found consistently poorer as compared to other groups. F ratios for all the three main effects were significant beyond the level of .01. Further analysis showed that normals, neurotics and psychotics were not significantly different, but differed from the organic group at .01 level.

The reliability coefficients suggested that the relative position of the subjects remained almost similar when the test was re-administered over a week. No significant mean differences were found in the performance of 'psychotic and organic' and 'normal and neurotic' groups.

Attention and Concentration (Sub-test 4)

Results showed that the organic cases performed consistently poorer on both the items of this sub-test significantly ($p < .01$). F-ratios for three main effects, viz. diagnosis, schooling and sex, were found to be statistically significant at 0.1 level. None of the interactions, however, was significant. Further multiple comparisons suggested that the mean score of organic cases on this sub-test was significantly poorer as compared to remaining three categories of subjects. Schooling seems to have linear relation with the scores.

Delayed Recall (Sub-test 5)

The analysis of data revealed that the performance of normals and neurotics did not differ significantly. However, organics and psychotics

differed significantly amongst themselves and from normal and neurotic groups at .01 level. Educationwise, all the three groups of schooling differed significantly at .01 level. The poorest mean score was found for up to 5 years of schooling group whereas the highest mean value was found for '10 and more years'. The mean score of females on this sub-test was also found to be significantly poorer as compared to that of the males. The reliability coefficient was found to be high and significant at .01 level on repeat-testing over a period of week. Mean performance showed upward trend on repeat-testing but significant difference was found only for 'normal neurotic' group.

Immediate Recall (Sub-test 6)

The overall performance was found to be statistically different among the four groups. In addition, the performance was dependent on educational level of the case. However, the multiple comparison showed that the mean performance of psychotics differed with each other and from normals and neurotics significantly ($p=.01$). All the three educational groups differed significantly with one another. The performance of males and females did not show any significant difference. The test-retest reliability was found to be satisfactory on repeat-testing after a period of one week.

Verbal Retention for Similar Pairs (Sub-test 7)

Results indicated that each item had criterion validity and could differentiate the organic group significantly from rest of the groups. The analysis of variance suggested that F-values were significant for diagnosis and schooling. The F-value for sex and none of the interactions was found to be significant. The Duncan's Multiple Range Test showed that the organic group obtained significantly (.01) low mean scores as compared to rest of the three categories of cases. The psychotic group was found to be significantly (.05) different from neurotic and normal groups in its performance on this sub-test. However, normal and neurotic groups did not differ with each other with regard to their mean scores. Schooling was found to have linear relationship with the scores as all the three levels of schooling had obtained significantly different mean scores. The consistency of scores in terms of its relative position was maintained on repeat testing (correlation being significant).

Verbal Retention for Dissimilar Pairs (Sub-test 8)

The performance of normal, neurotic, psychotic and organic groups differed significantly at each trial ($p < .01$) with regard to each of the five pairs of words of this sub-test.

The analysis of variance showed that F-values were significant for diagnosis and schooling. The F-value for sex and none of the interactions was found to be significant. The Duncan's Multiple Range Test indicated that the normals and neurotics did not differ significantly. However, organic and psychotic groups were found to significantly differ with rest of the categories, beyond the level of .01. Cases with '6—9' and '10 and above' years of schooling also did not differ significantly. The consistency of the scores in terms of its relative position was found to be satisfactory.

Visual Retention (Sub-test 9)

The performance on each of the items was significantly different amongst groups. The composite score on this sub-test was the lowest for the organic group as compared to rest of the three groups of subjects. Years of schooling and sex of the subject had a relationship with the scores. However, interaction of sex, schooling and diagnosis was not found to have any influence on the scores of this test. The test-retest reliability in terms of absolute and relative consistency of scores was found to be satisfactory as the reliability coefficient between initial and second administration was found high ($p < .01$) and the mean difference was not found to be significant.

Recognition (Sub-test 10)

Each item was consistently scored poorly by the organic cases. The composite score on this sub-test was found to be the lowest in the organic group followed by psychotics and neurotics. Neurotics, however, did not differ significantly with the normals. The group of '0—5' years of schooling, obtained significantly low score as compared to other two categories ($p < .01$). But the difference between '6—9' and '10 and above' categories did not reach the level of significance. The interaction of diagnosis, schooling and sex was not found to be significant in influencing the test scores. The test-retest reliability in terms of absolute and relative consistency was found to be satisfactory.

CONCLUSIONS

1. The present memory test is a comprehensive battery of 10 sub-tests which measure different aspects of memory and employ different methods of recall. It is simple in its language, meaningful in contents and less affected by the general intelligence test scores and the sex of the subject. Education and sub-test scores are positively related, requiring separate norms.

2. All the sub-tests separately as well as the full test score are found to be stable when repeat-tested over one week. The full test mean score shows some practice effect (increase of four points) on repeat-testing.

3. The construct validity is shown by the fact that both the hypotheses put forward, i.e. organic and older subjects would obtain lower scores, are retained. It also compares favourably with the existing comprehensive measures of memory (Boston Memory Scale and Wechsler Memory Scale).

4. The scores are converted in quintile separately for three education groups, i.e. 'up to 5', '6-9' and '10 and above' years of schooling. Normal-neurotics scores fall in the middle quintile, while psychotics fall in the second and organics in the first quintile on most of the sub-tests.

5. Profile analysis is recommended and a need is felt for further work to find out the patterns of memory of different homogenous groups of mental illness.

[Abstract Prepared by Neerja Shukla]



Education of a National Minority

A Case of Indian Muslims

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Need of the Study

THE Constitution of India provides for minority rights to equality under the Fundamental Rights and the Directive Principles of the State, particularly through the following Articles :

ARTICLE 15

- I. The State shall not discriminate against any citizen on grounds only of religion, race, caste, sex, place of birth or of any of them.
- IV. Nothing in this Article or in Clause (2) of Article 29 shall prevent the State from making any special provisions for the advancement of any socially and educationally backward classes of citizens or for the Scheduled Castes and Scheduled Tribes.

ARTICLE 29

- I. Any section of the citizens residing in the territory of India or any part thereof having a distinct language, script or culture of its own shall have the right to conserve the same.
- II. No citizen shall be denied admission into any educational institution maintained by the State or receiving aid out of State funds on grounds only of religion, race, caste, language or any of them.

Thesis submitted to Jamia Millia Islamia (1975), New Delhi

January 1978

INDIAN EDUCATIONAL REVIEW

ARTICLE 30

- I. All minorities, whether based on religion or language shall have the right to establish and administer educational institutions of their choice.
- II. The State shall not, in granting aid to educational institutions, discriminate against any educational institution on the grounds that it is under the management of a minority, whether based on religion or language.

ARTICLE 46

The State shall promote with special care the educational and economic interests of the weaker sections of the people, and in particular of the Scheduled Castes and the Scheduled Tribes, and shall protect them from social injustice and all forms of exploitation.

Despite these provisions Muslims, who are about 11% of the total Indian population, express a widespread feeling that they are not treated equally in different matters including education. They feel that their status is constantly deteriorating in all aspects of life and that they are discriminating against in the provision of educational opportunities. Hence the need to study the provision of educational opportunities for Muslims in terms of the following definitions of equality :

1. that access to schooling is available to all citizens irrespective of caste, religion, social and economic status for any other attribute ;
2. that special provision is made to facilitate the utilization of educational opportunities by economically disadvantaged citizens ;
3. that school programmes offer equal attraction to the members of the different cultural and religious communities possessing different heritages and values ;
4. that there is nothing in the school curriculum and textbooks, its procedures and practices, its rites and rituals, its cultural functions and recreational programmes, i.e. in the total environment of the school that discriminates against any cultural or religious community or its repugnant or abhorrent to it, thus repelling its members from the school.

Hypotheses

The following hypotheses were studied :

1. Other things being equal, the Muslim community tends to have less than its equal share of educational opportunities as compared with non-Muslims.
2. There exist elements inherent in the educational programmes which discourage Muslims from taking the advantage of educational opportunities in an equal measure with non-Muslims.
3. The social, economic and cultural conditions of the Muslim community tends to restrict the utilization of educational opportunities by its members as compared with non-Muslims.

Delimitations

The study was limited to Delhi where the Muslims constitute 6.47% of the total population and are concentrated into selected pockets to be easily accessible for the study.

Sampling

The population for the study comprised all students of the terminal classes at the primary, middle and higher secondary stages of schooling, heads and teachers of these schools ; parents, and prominent local leaders of the areas covered. Of the 33 Urdu-medium primary schools (16 for boys and 17 for girls), 13 schools (6 for boys and 7 for girls) were randomly selected ; and of the 12 middle and 5 higher secondary schools, imparting instruction partially or fully in Urdu only, 12 higher secondary ones were covered. For the purpose of comparison of socio-economic background of students, two boys' schools and one girls' school were chosen from the matching neighbourhood. The number of students covered is as follows :

	CLASS V			CLASS VIII			CLASS XI		
	Muslims	Non-Muslims	Total	Muslims	Non-Muslims	Total	Muslims	Non-Muslims	Total
Boys	297	176	473	294	103	397	172	84	256
Girls	212	151	363	141	114	255	128	117	245
Total	509	327	836	435	217	652	300	201	501

Total number of students : 1989

All the heads and teachers of these 27 schools, 50 parents from the neighbourhood who were not sending their wards to schools, and 45 public leaders of the area also formed the subjects of the study.

Variables Tested

The first hypothesis refers to the numerical strength of students from the community as compared with students from other communities. To verify this, data giving the number of students at different levels were collected and the coefficient of equality was computed. The coefficient of equality denotes the position of a group in the use of educational opportunities as compared to another group.

Where educational opportunities are provided on an equal basis to the Muslim community, their proportion of participation should be in proportion to their population. In other words, the coefficient of equality should be 100. If it is found to be more than 100, we may infer that the community in question has an advantage over other communities. If it is less than 100, it implies that the community is lagging behind in its use of educational opportunities.

The second hypothesis refers to the impediments faced by Muslim students in the pursuit of schooling. To verify this, comparative data from Urdu-medium and non-Urdu-medium schools were collected from students, teachers, heads of institutions on the following variables :

1. STUDENTS : Socio-economic status, self-concept, parents' aspiration, physical facilities offered by the school, intelligence and achievement. One-way analysis of variance was used to measure the significance of difference between Muslim and non-Muslim students on the mean age, socio-economic status, intelligence and achievement.

2. HEADS OF SCHOOLS : Type of school, academic results, co-curricular programmes, etc. and their views on problems related to the school in general.

3. TEACHERS : Educational and occupational status, amount of teaching experience and their opinions on issues which may affect the quality of education given to children.

The third hypothesis refers to the disadvantages of Muslims in the social, economic and educational spheres which may determine their failure to perceive the important association of education with future career success. To verify this hypothesis, data were collected from public leaders and parents on the following variables :

1. PUBLIC LEADERS, EDUCATIONISTS AND SOCIAL WORKERS : Muslims' feeling of discrimination in the matter of education and employment; reasons for

their non-utilization of educational opportunity; the responsibility of the State in this regard ; role of the Muslims of the elite ; role of charitable trusts and religious endowments ; and the type of efforts the State authorities should make to attract them to schools.

2. PARENTS : Type of family, educational and employment status, income, socio-economic status, reasons for non-utilization of educational opportunity and general suggestions.

Tools for Data Collection

The following four tools were used to collect the data.

1. QUESTIONNAIRES : Questionnaires for the heads of institutions and teachers of the primary and higher secondary schools were constructed keeping in view the following points :

- (a) The purpose of the study was explained on the cover page and an appeal was made for cooperation.
- (b) Dummy tables were prepared to avoid irrelevant questions.
- (c) Each question was made specific and precise.
- (d) Questions were framed in simple and easy language.
- (e) Questions were logically structured.
- (f) Pre-coding of the probable responses was done to reduce errors and facilitate statistical analysis.

Questionnaires for heads of institutions and teachers included questions on factual information and matters of opinion. Questionnaires for students were framed in Urdu and Hindi. Questions were of three types, relating to factual information, motivation, and opinions.

2. INTERVIEW SCHEDULES : Two interview schedules were prepared—one for the public men to obtain information on educational issues concerning Muslims, and the other for Muslim parents to identify factors which act as barriers to utilization of educational opportunities by their children.

3. SCHOOL EXAMINATION RECORDS : In Delhi, when the study was undertaken, there existed a common trend of yearly examinations for students of Class IV. Likewise, the Directorate of Education held at zonal levels, a common examination for the students of secondary and higher secondary classes. Students answered the same question papers, and these were evaluated by the respective schools. This provided a certain degree of justification of comparison of scores obtained by students. Other factors which affected the achievement of students such as teachers' subjectivity and school environment could be expected to have more or less a uniform

impact on our sample. Therefore, total marks obtained by students of Classes V, VIII and XI in their previous years, i.e. Classes IV, VII and X, respectively, were taken down from the examination registers of schools under study. Its purpose was to have some idea about the achievement of Muslim and non-Muslim students, respectively.

4. CATTELL'S CULTURE FAIR INTELLIGENCE TEST : Cattell's test of 'g' Culture Fair Form A, Scales 2 and 3, was administered to students of Classes V, VIII and XI, respectively.

Analysis and Interpretation of Data

The coefficient of equality for the Muslim community at the primary stage was 85.4 in New Delhi Municipal Committee area and 62.6 in Delhi Municipal Corporation area, while the overall coefficient at this stage was 74. At the secondary and post-secondary stages it was found to be only 23.6. Various factors were responsible for this lag in the primary education of Muslims in Delhi. However, Muslim students are even superior to children of other communities in many respects. Socio-economic and educational status of Muslims at these stages does not differ significantly from that of other communities. They offer more private tuition facilities to their children and have better aspiration levels. Muslim students at different levels of schooling believe in a sort of close culture, close system and close values. They are afraid of anything which is outside their accepted beliefs and values. Such factors are retrograding and operate to the disadvantage of these students. They feel insecure in common schools and suffer from patterns of withdrawal behaviours.

The one-way analysis of variance has also been studied in terms of age, socio-economic status, intelligence and achievement of Muslim students at different stages of school education. The mean age of Muslim boys at the primary stage is significantly higher than that of the boys of other communities. Muslim boys, though indicate higher intelligence, do not match in their academic achievements. Similarly, the primary school Muslim girls indicated better socio-economic status, higher achievement and higher intelligence than Non-Muslim girls.

There is no significant difference between mean age, socio-economic status and intelligence of students from different groups at the secondary stage. Muslim boys have, however, shown better academic achievement in subjects other than science. The achievement in science did not show any significant difference.

In the opinion of headmasters and teachers, the schools for Muslims suffer from poor space, building facilities and equipments as compared to

common or Hindi schools. Besides, Muslim teachers have poorer socio-economic background. Similarly, public leaders, educationists and social workers opined that various factors stand against Muslims in the proper utilization of the available educational facilities. They affirm that poor economic and professional status of parents stand in the way of children's education. The business community makes lesser use of educational opportunities than the service class. Besides, schools do not offer arrangements for religious education and that is why most Muslim students, particularly girls, attend *maktabs* up to the age of 11 years, to receive religious education. They also believe that modern secular education is a costlier affair and its contribution is only in terms of making the child a liability for the parents rather than an asset. The poor parents assert that education for their children is merely a waste of time, energy and resources.

Conclusion

The three hypotheses were tested to ascertain the extent to which Muslims, as compared to non-Muslims, were enjoying educational opportunities at the primary, middle and higher secondary levels of education; as well as to enumerate those factors which might discourage Muslims in making optimum use of available educational opportunities.

The first hypothesis was tested through computation of the coefficient equality. It showed that Muslims were represented at less than their proportionate strength in the educational institutions of Delhi.

Regarding the second hypothesis, headmasters and teachers expressed that ideal educational situations do not exist in Urdu-medium schools. They are, on the whole, overcrowded with more students per teacher. In general these differences are not so great as to be favourable to the other communities either. This may be due to the fact that the sample taken for this study consisted of Muslim and non-Muslim students coming from the same neighbourhoods. In Delhi, better schools are available for those who receive their education through an instructional medium other than Urdu. The overall conditions do affect the provision of and access to equal educational opportunities for Muslims of Delhi who would generally like to educate their children in Urdu-medium schools.

To verify the third hypothesis, data were collected from public leaders and parents who maintained that barriers which stand in the way of Muslim parents making full utilization of educational opportunities for their children may be ranked in the following order of importance: Social and cultural factors, economic and religious factors, irrelevancy of educational offerings to existing job opportunities and restriction of admission

to schools of their choice. However, the most potent cause which discouraged Muslim parents from sending their daughters to schools was their abhorrence of a modern education which, according to their conviction, spoils girls.

Interviews on the problems of Muslim education with certain public leaders, educators and prominent citizens of Delhi revealed that barriers encountered by the community in the use of educational opportunities were varied, complex, and rooted in tradition. Firstly, the cause of the present situation is historical one: The migration of Muslims, with traditions of learning, to Pakistan and subsequent neglect of their former centres of learning such as Bhopal, Aligarh, Lucknow and Deoband. Secondly, illiteracy remains prevalent among the Muslim masses. Thirdly, there are no provisions for religious instruction in the school curriculum. Fourthly, it is feared that there is a deliberate attempt by the government to impose upon Muslims the majority culture through educational programmes offered. Fifthly, economic compulsions do not allow them to spare their children for schooling. Sixthly, Muslims feel the sting of the prevailing bias against Urdu, their mother tongue. Seventhly, the high cost of schooling and unemployment among the educated youth are also the discouraging factors.

The Muslim community, unlike other communities, is classified into two strata only, i.e. the lower and the upper. The absence of the middle class deprives the Muslim community of a leadership which serves as an important link between the lower and the upper strata. The upper class of this community is occupied with the pursuit of its self-interests and has no time to think about the weaker section of the Muslim community. The gap between the two groups is so wide that there is little mutual interaction.

[Abstract prepared by D. N. Khosla]



A Study of Perception of Work-Values in Teaching and Non-Teaching Occupations

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THE present study has been inspired by the Kothari Commission's assertion that "the efficiency of teaching profession and its contribution to national development in general and educational improvement in particular will depend largely on its social status and morale".

The importance of job satisfaction and adjustment in work for an all-round happiness to the individual and for the general good of the society has been highlighted in this study.

The problem, its parameters and the phenomenon of perception has been defined in this study in terms of affective meaning which connotes personalized, emotive reaction to concepts. Satisfying experience leads to positive attitude and favourable perception. Dissatisfying experience leads to negative feeling and unfavourable perception of the concept. Though perception is a personalized subject-matter, yet it is influenced by the impact of social situation. It was this assumption which promoted the need of studying the perception of work-values not only of teachers but certain other white-collar jobs such as doctors, engineers, lawyers and administrators.

Objectives of the Study

1. Development of a work-value differential.
2. To study what factor structures underlie the scales of work-value differential and to compare the factor structures, emerging in the perception of different occupational groups.
3. To make comparison of all work-values among themselves in each job separately as they are perceived by holders of that job in order to examine within-job differences in the perception of work-values.
4. To make a comparative study of how any given work-value is perceived by different occupational groups in their own job.

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5. To make comparison among different occupational groups with regard to their perception of different work-values in teacher's job.
6. To make a comparison between teacher's perception of work-values in his job and his perception of those work-values in other jobs.
7. To make comparison of perception of work-values of teachers of favourable and unfavourable attitude towards teaching profession and of those rated effective and non-effective teachers.

Hypotheses

The following null hypotheses were established for the study :

1. There is no difference in factor structures emerging in the perception of work-values of different occupational groups.
2. There is no statistically significant difference between means of perception scores on any pair of work-value within a job.
3. There is no statistically significant difference between means of teachers' perception scores of work-values in his job and the means of perception scores of same values by each of the other four groups in their own jobs.
4. There is no statistically significant difference between means of teachers' perception scores of work-values in own job and means of his perception score of the same work-value in each of the other four groups.
5. There is no significant difference between means of teachers' perception scores and means of each of the other four groups' perception scores in regard to their judgement of work-values in teachers' job.
6. There is no significant difference between means of work-value perception scores of teachers of favourable and unfavourable attitude towards teaching.
7. There is no significant difference between means of work-value perception scores of teachers who are rated as effective and those who are rated as ineffective.

Procedure

This study was designed to be executed in two phases, namely,

1. (a) development of a measure of perception, called work-value differential;

- (b) identification of factor structures underlying the modes of perception of various occupational groups;
2. collection, analyses and interpretation of data.

Development of Work-Value Differential

The process of development of work-value differential as a specialized instrument involved the following major heads :

1. Selection of work-value concepts,
2. formation of bipolar scales,
3. final form of the work-value differential, and
4. its reliability and validity.

Selection of work-value concepts was made on the basis of good judgement of experts and relevance to the world of work. The following 12 work-values were selected : economic return, social service, prestige, intellectual challenge, power or authority, independence of work, chances of progress, material handled, adventure, associates, surroundings and variety.

The qualifier domain of 205 adjectives was then elicited from a sample of 100 subjects. From this domain of qualifiers, a list of 28 qualifiers was selected through *H* statistic and the coefficient analysis.

Administration of 28 scales (qualifiers with opposites) to 100 subjects was scored and data so obtained was factorized, thereby selected a number of 21 scales from a list of 28 scales initially selected on the basis of *H* statistic and Phi coefficients. The purpose of making factor analysis at this stage was to judge semantic stability of scales for the concepts. The scales in the final form were bipolar scales with seven points like those used in the tryout sample. The title page of the semantic differential contains the nomenclature of instrument and set of instructions, and each subsequent page carries name of a given work-value in a given job in the middle top followed by bipolar scales printed on the page.

Reliability of the Differential

The study reports two reliabilities :

- | | | |
|---------------------------|---|-------|
| 1. Item Score Reliability | = | .72 |
| 2. Split-half Reliability | = | .7585 |

Validity

The work-value differential is designed as an instrument for measuring perception. Ideally, therefore, there should have been some independent criterion of perception. But for want of such a criterion, concurrent validity was established. The mean score of perception of two categories (with attitudes favourable and unfavourable towards their job) of teachers was tested for significance. The t-ratios thus obtained were found significant. This shows that positive perception of work-values was related to higher score on attitude scale. The validity of perception factor was also ascertained.

Other Tools

In addition to the work-value differential developed by the investigator, two other tools were used :

1. Attitude towards teaching scale.
2. Teacher-effectiveness rating scale.

The first was devised by M.R. Verma of Aligarh Muslim University, and it consisted of 40 items, while the second one was standardized by the author himself. The split-half reliability of the attitude scale was reported to be .91 and the validity as correlated with MTAI was found to be .65. The teacher-effectiveness rating scale consisted in dimension with four scales in each dimension to be rated by superior colleague and students. This instrument was found sufficiently reliable and valid. The inter-rater reliability reported between pairs of groups of principals, teachers and students was .678, .884 and .970, respectively, and the split-half validity coefficient was also found moderately high when correlated with Ved Prakash's rating scale.

Sample

For this study, samples were selected at several stages to serve the following purposes :

1. For eliciting qualifier domain (20 from each occupational group and 100 in all).
2. For final selection of scales (20 from each group and 100 in all).

A STUDY OF PERCEPTION OF WORK-VALUES

3. For making a comparative study of the work-values of five occupational groups (50 from each group and 250 in all).
4. For the study of differences in work-values between teachers of favourable and unfavourable attitude towards teaching (10 from each end of the distribution of 30 teachers).
5. For making a comparative study of perception of work-values of effective and ineffective teachers (15 from each end of the distribution of 50 teachers).

Findings

Some occupational differences were uncovered in nature, magnitude and order of appearance of factors that emerged in the perception of sample representing different occupational groups as shown below :

FACTORS OF PERCEPTION OF FIVE OCCUPATIONAL GROUPS

Factor	Variance accounted for					Order of appearance				
	Trs.	Drs.	Enrs.	Lrs.	Ars.	Trs.	Drs.	Ers.	Lrs.	Ars.
1. Evaluation	44.48	20.64	21.02	26.75	23.30	1	2	3	1	4
2. Work-morality	26.70	33.41	8.84	—	19.36	2	1	10	—	2
3. Approachability	—	—	—	—	11.42	—	—	—	—	3
4. Work-complexity	—	—	9.51	—	—	—	—	6	—	—
5. Potency	13.76	17.39	15.58	16.82	—	3	3	1	4	—
6. Activity	—	—	13.95	—	—	—	—	2	—	—
7. Dynamism	—	—	—	—	36.78	—	—	—	—	1
8. Oriented	—	—	—	22.92	—	—	—	—	3	—
9. Novelty	9.46	13.74	—	11.88	9.20	5	6	—	6	5

The following points summarize the trend discernible in these differences :

1. The differences have been found to occur in types of factors specially minor ones and in their magnitude and order of appearance which is shown in the table above. This fact leads to the conclusion that with the change of population which varies on job variable, a shift in factor loadings may take place resulting in emergence of different factors.

2. Notwithstanding the observed differences, the factor 'evaluation' is common to all five factor structures and work-morality, which is socially

evaluative mode of the general factor of 'evaluation', when added to it, makes this factor most preponderant in the perception of all the groups. It contributes roughly to 71, 43, 30, 27 and 43 per cent to the total extracted variance in the perception of teachers, doctors, engineers, lawyers and administrators, respectively. The modes of perception of different occupational groups are both similar and different. However, the major factors are represented alike. 'Evaluation' transcends occupational and cultural boundaries and it is occupationally and culturally invariant. The fact that it varies in regard to dominance in the perception of differing occupational group is not difficult to explain. The variance or invariance depends upon whether the populations upon which factorization is done are impelled by the same mode of perception or not.

3. The factor structures extracted in this study do not exhibit total congruence with Osgood's EPA model. Evaluation has been commonly present in all groups' perception in this study; its order of appearance and magnitude, of course, varies from one occupational group to other which is also in agreement with findings of Osgood.

But 'potency' and 'activity' factors have failed to occur as major factors in this study. So, generalizability across cultures posited by Osgood in his EPA model is not fully corroborated by the factor structures obtained in this study.

Perception of Work-values within Occupational Groups

Comparison of work-values within each of the occupational groups revealed the following facts :

1. F-ratios indicating an overall difference among means of various work-values within each group were all found significant at .01 level.
 2. When individual pairs of means were tested for significance statistically, significant difference was found in the means of some and not all work-values.
 3. The relative attractiveness of different work-values in a given occupation were mostly found to differ from group to group.
- A. *Comparison of teachers' perception of work-values in teaching with other groups' perception of the same values in their own job*
1. An overall significant difference among five occupational groups in perception of each work-value in their own job exists.
 2. The teachers have been found to perceive their job almost similarly as doctors perceive their job.

3. Correspondence in the perception of teachers and administrators has been found on eight out of 12 work-values. Administrators perceive power and prestige associated with their job more positively than teachers perceive them in teaching. The teachers, on the other hand, find 'independence' and 'intellectual challenge' more positive than administrators find them in their job.
4. Teachers' evaluation of the following work-values in their job is more generous than lawyers' evaluation of the same values in their job: economic return, independence, chances of progress, material handled, adventure, associates, surroundings and variety.
5. A great incompatibility is evidenced in teachers' and engineers' perception of work-values on nine out of 12 work-values. The teachers perceive these values in teaching more favourably than do engineers in their job.
6. These results suggest that teachers' job morale is higher than that of doctors, engineers and lawyers. No such definitive conclusion can, however, be drawn when teachers and administrators are compared.

B. Comparison of teachers' perception^{} of work-values in their own and other groups' jobs*

7. Overall significant differences were found in teachers' perception of work-values in their job and their perception of same work-values in other white-collar jobs except on 'economic return' and 'material handled'.
8. No significant differences were noted in teachers' perception of work-values in their own job and their perception of work-values in doctors' job, although teachers rated doctors' job somewhat higher than that of doctors themselves.
9. Teachers feel that their job offers independence, greater opportunity for social service and healthier surroundings than does lawyers' job. Still, teachers are found to evaluate lawyers' job more favourably than do lawyers themselves.
10. Teachers feel that their job provides more opportunities of social service, intellectual work, freedom and good associates than engineers' job.
11. Teachers find their job more attractive than that of administrators with regard to 'intellectual challenge' and 'independence' and administrators' job more attractive in terms of power.

C. Comparison of teachers' perception and each of the other group's perception of work-values in teaching

12. Overall significant differences in perception of work-values in teaching among the five occupational groups were found, except on the work-value 'power'. It implies a general agreement among the teachers, lawyers, engineers, doctors and administrators regarding what teaching has to offer in terms of 'power' to its employees.
13. The perceptions of teachers and doctors were found similar with regard to various work-values in teachers' job. No statistically significant difference was noted between the two groups on any values.
14. Doctors adjudge teachers' job less positively than teachers with regard to social service, independence, surroundings, variety and adventure. On other values the perception of the two groups are alike.
15. Lawyers have been found to differ significantly from teachers in their judgement of teachers' job on almost all work-values except 'power', 'prestige' and 'associates'. They evaluate teachers' job less positively than the teachers.
16. Engineers are also less generous evaluators than teachers of various work-values in teachers' job.

D. Comparison between teachers of favourable and unfavourable attitude and between effective and ineffective teachers

17. The perception of teachers of favourable attitude is characterized by three factors, namely, 'evaluation', 'work-morality' and 'dynamism' whereas that of teachers of unfavourable attitude by factors produced by clustering of scales of clearly differing nature and hence named 'chaos'. Another factor that emerged in the perception of this group of teachers is 'work-morality'.
18. The teachers with favourable attitude towards teaching adjudge teaching job more favourably than the other group on these values: 'social service', 'intellectual challenge', 'prestige', 'chances of progress', 'material handled' and 'adventure'. No difference was found in the two groups on perception of other work-values.
19. The factors that emerged in the perception of effective teachers are 'evaluation', 'work-morality', 'prestige', 'activity' and 'novelty'. In case of ineffective teachers, they are 'evaluation', 'potency' and 'activity'.

20. The effective teachers are found to differ significantly from ineffective teachers on these work-values : 'economic return', 'social service', 'intellectual challenge' and 'independence'.
21. The teachers of favourable attitude towards teaching were found to enjoy their job in greater degree than teachers of unfavourable attitude towards teaching.
22. Similarly, effective teachers were found to have higher job morale than ineffective teachers.
23. No agreement was found between teachers of favourable attitude and those of unfavourable attitude in order of work-values on the basis of relative satisfaction they derived from them.
24. Similarly, no agreement was found between effective and ineffective teachers in ordering of work-values on the basis of relative satisfaction on different values.

E. Validity and reliability of tools

25. The technique of semantic differential on which the work-value differential was developed, was found to be suitable and an effective method for measurement of perception. The reliability of the tool as found through test-retest and split-half methods came to be .72 and .78 respectively. The concurrent validity was determined and found satisfactory.
26. The teacher-effectiveness rating scale developed for the study was also found a useful tool for the purpose for which it was constructed. Its validity was found to be .72 and the inter-rater reliability .678, .884 and .97 respectively, between principal and teachers, principal and students, and teachers and students.

Effect of Instructional Material and Feedback upon the Development of Teaching Skills of Set Induction and Closure

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Objectives

THE study was conducted keeping the following objectives in view :

- (i) To examine the nature of written feedback provided to the student-teachers in the prevailing student teaching programme.
- (ii) To study the attitude of student-teachers towards microteaching approach.
- (iii) To develop instructional materials for selected teaching skills.
- (iv) To study the effectiveness of instructional materials in developing corresponding teaching skills and general teaching competence among student-teachers.
- (v) To study the effect of different training approaches upon the attitude of student-teachers towards teaching.

Hypotheses

To fulfil the objectives of the study, the following hypotheses were formulated :

- (i) Student-teachers exposed to microteaching in simulation do not have favourable attitude towards microteaching.
- (ii) Student-teachers of the experimental groups having the treatment of instructional materials and skill-based feedback in microteaching settings for the selected teaching skills do not differ significantly in the acquisition of these skills from the control group.
- (iii) Student-teachers of the experimental groups having the treatment of instructional materials and skill-based feedback in microteaching settings do not differ significantly in the acquisition of general teaching competence from the control group.
- (iv) Student-teachers of the experimental groups having the treatment of instructional materials and skill-based feedback in microteaching settings for the various teaching skills do not differ significantly in their attitude towards teaching from the control group.

*Thesis submitted to M. S. University of Baroda (1977)

pective covariates. The variable of attitude towards teaching was measured by the Ahluwalia Teacher Attitude Inventory was used as criterion variable. Apart from this, the criterion variables representing the skill of introducing a lesson, skill of achieving closure, skill of reinforcement, skill of fluency in questioning, and skill of probing questioning were measured with the help of skill-based observation schedules. The criterion variable of general teaching competence was measured by employing the Baroda General Teaching Competence Scale (BGTCS). Data related to the criterion scores for five instructional skills and general teaching competence observed for five different skills, and general teaching competence observed for four different lessons in school settings were analysed by employing ANCOVA. These data were available for three groups—A, B and C. Data related to attitude towards teaching were also analysed through ANCOVA.

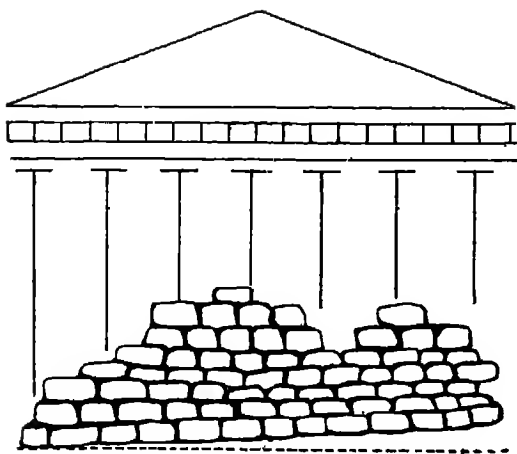
Conclusions

Based upon the results and their discussion, the following conclusions were drawn :

- (i) For as many as 762 lessons, there were 2065 comments given by college supervisors. The average comment per lesson happened to be 2.71. The number of comments given at the beginning stage of practice teaching were more than at the end stage. There was relationship between the nature of comments and the stage of practice teaching. Generally, the remarks given by the supervisors were subjective, general, prescriptive, unstructured in nature, and clustered round a few aspects of teaching.
- (ii) Majority of the student-teachers who attended the microteaching programme under simulated conditions expressed a favourable attitude towards microteaching programme and its various aspects.
- (iii) Instructional materials in the form of handbooks for teachers related to the skill of introducing a lesson, skill of achieving closure, skill of reinforcement, skill of fluency in questioning, and skill of probing questioning, were prepared. At present, they are available in the form of a printed book.
- (iv) Student-teachers of the experimental group having the treatment of instructional materials and skill-based feedback in microteaching settings differed significantly than that of other experimental group having the treatment of other teaching skills in microteaching settings but not having instructional materials in that skill and the control group in the acquisition of teaching skills.

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- (v) Student-teachers of the experimental group having the treatment of instructional materials and skill-based feedback in microteaching settings for one set of skills differed significantly from those of other experimental group having the same treatment in the other set of skills and the control group in the acquisition of general teaching competence.
- (vi) Student-teachers of experimental group having the treatment of instructional materials and skill-based feedback in microteaching settings for one set of skills, those of the experimental group having the same treatment of other set of skills, and those of the control group did not differ significantly with each other in their attitude towards teaching. □



Research Notes

Problems of Work-Experience Teachers in Delhi

A Study

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Introduction

THERE has been a general dissatisfaction against the present system of education in India. It is sterile, book-centred and examination-oriented system of education that developed along traditional lines during the British rule in India.

The system of basic education as propounded by Mahatma Gandhi was in fact a revolt against this sterile system of education. But this revolutionary experiment also could not make much headway for various reasons. However, renewed efforts are being made to impart basic education in all the schools by providing work-experience to all children in the 10+2+3 pattern of education. This pattern of education is based on the recommendations made by the Kothari Commission. It envisages ten years of general education, two years of higher secondary and a three year degree course. In the first stage, a student will be trained to acquire minimum proficiency in languages, science and mathematics, health education and some awareness of our cultural heritage and contemporary issues. In the next stage, emphasis would be laid on teaching of natural sciences. It is designed to enable students to take up professional courses in engineering, medicines, agriculture, etc, so that after its completion they may start independent

ventures. For most of the students this stage would serve as terminal and only a limited number of bright students will go in for higher learning.

One of the main planks of the new pattern of education is work-experience, which will form an integral part of all education, general or vocational. This concept of work-experience is essentially similar to what Gandhi had envisaged. It may be described as a redefinition of his educational thinking in terms of a society on road to industrialization.

The basic objective of work-experience is to develop proper attitude towards work, to inculcate dignity of labour, banish status and class distinctions and to stress principles of productivity. Work-experience has been defined as "participation in productive work in school, in the home, in a workshop or in a farm, in a factory or in other productive situations".

Work-experience activities will provide opportunities to the students according to their abilities and capacities. They will learn how to handle basic material, tools and operations used for production and also have some earnings, if possible. Thus they will develop a healthy attitude towards manual labour and make the distinction between intellectual and manual work less marked.

The Central Board of Secondary Education undertook this challenging task and introduced the new pattern of education in Delhi from the academic session 1975-76. A list of 43 work-experience activities was prepared to be introduced in the schools.

Although a great deal of advance preparation was made by the Board and the organizations concerned, yet many unforeseen problems cropped up during the working of the new pattern specially in the area of work-experience. Most of these problems were beyond the reach of the work-experience teachers. Thus progress of education was sufficiently hampered.

Purpose of the Study

The purpose of the study was to investigate into various problems faced by the work-experience teachers in implementing the programme of work-experience in Delhi schools and suggest ways and means to solve them.

Procedure

Preliminary discussions were held with many work-experience teachers to collect information regarding their problems. On the basis of this discussion, a questionnaire was formulated. To standardize the questionnaire, it was administered to 20 work-experience teachers. On the basis of their responses, the questionnaire was finalized.

Sample

A sample of 150 work-experience teachers (male and female) was drawn from 45 government higher secondary schools in Delhi, where guidance counsellors are posted. Such schools were purposely chosen because through the counsellors it was easier for the investigator to administer the questionnaire to the teachers concerned and get it back in time.

The sample covered teachers from the following work-experience activities : photography, electrical gadgets, electronics, commercial art, mechanical, batiks, tie and dye, clay modellings, gardening and crop production, tailoring and embroidery, maintenance of household gadgets, bakery and confectionery, music, wood work, and leather work.

Analysis and Interpretation of Data

The questionnaire was sent to 150 teachers but only 120 teachers (70 male and 50 female) returned it to the investigator duly filled in. Hence the final sample consisted of 120 work-experience teachers. Because of the nature of the schedule, no sophisticated statistical techniques were used.

First, an attempt was made to analyse the background information about the teachers. It was found that the sample consists of three categories of teachers who are imparting work-experience to the students in different schools.

- (i) Only 20% of the teachers have undergone full-time training in their respective trades and teaching work-experience.
- (ii) Sixty per cent of the sample comprises those teachers who are already teaching home science, art, music, and so on. These subjects are included in the list of the work-experience activities.
- (iii) The rest belongs to the category known as subject teachers like chemistry, physics, English, etc.

(a) *Philosophy of work-experience* : The data revealed that all the male and female respondents agree with the philosophy of work-experience.

(b) *Number of students in relation to number of periods* : Ninety per cent of male and 80% of female teachers feel that there is no relationship between the number of students and the number of periods allotted to the work-experience activity.

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From Table 1 it is evident that 84% of male and female teachers were of the opinion that minimum number of periods allotted to the work-experience activity should be between 10-12 in a week.

Table 1
FREQUENCY DISTRIBUTION OF THE NUMBER OF PERIODS SUGGESTED BY THE TEACHERS

<i>No of Periods</i>	<i>Male Frequency</i>	<i>Percentage</i>	<i>Female Frequency</i>	<i>Percentage</i>
12	36	51.42	24	48.00
10	25	37.72	16	32.00
9	9	13.58	8	16.00
8	—	—	2	4.00
Total	70	100.00	50	100.00

It was found that 85.71% male and 76% female teachers have indicated that the number of students are more than required.

Table 2
THE NUMBER OF STUDENTS SUGGESTED IN THE ACTIVITIES

<i>Number of Students</i>	<i>Male</i>	<i>Percentage</i>	<i>Female</i>	<i>Percentage</i>
10-15	5	7.14	4	8.00
15-20	11	15.71	12	24.00
20-25	44	62.85	28	56.00
25-30	10	14.28	6	12.00
Total	70	100.00	50	100.00

Table 2 indicates that about 63% male and 56% female teachers are of the opinion that generally the number of students in the work-experience activity should be between 20-25.

(c) *Utility of work-experience* : All the male and female teachers think that the work-experience activity will be of some use to the students in future.

Table 3
FREQUENCY DISTRIBUTION INDICATING THE UTILITY OF
WORK-EXPERIENCE

No.	Common Responses	Male Frequency	Percentage	Female Frequency	Percentage
1.	Solving the problem of unemployment	50	71.43	32	64.00
2.	May start their own business/ work (self-employment)	15	21.42	8	16.00
3.	Security for future	10	14.28	4	8.00
4.	May take up as a hobby	30	42.85	29	58.00
5.	Source of recreation	25	35.71	18	36.00
6.	Utilization of leisure time	15	21.42	25	50.00
7.	Dignity of labour	39	55.71	27	54.00
8.	May be useful in daily life	9	14.00	11	22.00
9.	May meet the domestic needs	5	7.14	8	16.00
10.	Opportunity of learning by doing	29	41.42	11	22.00
11.	Acquire practical knowledge	10	14.28	—	—
12.	Scope of developing creative faculty	11	15.71	10	32.00
13.	Part-time source of income	25	35.71	15	30.00

Table 3 shows that the male respondents have shown maximum preference for solving the problem of unemployment (71.43%), dignity of labour (56%), hobby (43%) and opportunity of learning by doing (41%). The female respondents too have shown their maximum preferences for the same three factors : solving the problem of unemployment (64%), dignity of labour (54%), and hobby (58%). But in this respect there is a difference. The second preference for the male is 'dignity of labour' while in the case of female it is 'may take up as a hobby'. Besides 'utilization of leisure time' (50%) also assumes a very significant factor in the case of female respondents.

(d) *Students' working knowledge of the work-experience activity* : It was found that 67% male teachers and 56% female teachers are of the opinion that a large number of students will not be in a position to acquire working knowledge of the activity due to limited time and resources under the present situation in schools.

(e) *Establishment of workshop/darkroom, practical work and individual guidance* : It was found that 33% male teachers will not be able to esta-

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blish workshop/darkroom or laboratory for practical work. The situation in the girls' schools is comparatively better since almost all the teachers there have got the above facility for practical work. This is due to the fact that most of the girls' schools offered activities like commercial art, tailoring, meal planning, music, etc. for which they already had the facility of laboratory, workshop, etc.

Table 4
FREQUENCY DISTRIBUTION SHOWING FACTORS FOR
NON-ESTABLISHMENT OF WORKSHOP

No.	Factors	Male (23)	Percentage
1.	Lack of sufficient fund	23	100.00
2.	Shortage of accommodation	20	87.00
3.	Lack of sufficient apparatus, tools and equipment, etc.	19	83.00

Table 4 indicates some of the major factors responsible for the lack of workshop/darkroom/laboratory facilities in the case of male respondents. Nearly 33% male teachers have not yet started practical work. It is interesting to note that out of the total number of teachers (male, 47 and female, 50) who have started practical work, 28 male and 30 female teachers are not in a position to provide individual guidance to the students during the practical hours. Obviously, the question of individual guidance does not arise in case of those schools where practical work has not yet started.

Table 5
FREQUENCY DISTRIBUTION OF FACTORS RESPONSIBLE FOR
LACK OF INDIVIDUAL GUIDANCE

No.	Factors	Male (28)	Percentage	Female (30)	Percentage
1.	Large number of students in the activities	25	89	25	83
2.	Lack of required tools, equipment, etc.	21	75	15	50
3.	Less periods	18	64	21	70
4.	Short duration of periods	15	53	14	47

Lack of individual guidance is attributed to four major factors as given in Table 5. But both males and females attach major importance to the factor 'large number of students in the activities'.

(f) *Funds for the work-experience activities* : About 93% male and 90% female teachers are of the opinion that funds are insufficient to meet the requirements of the work-experience activities. This situation is more serious in case of those activities where workshops/darkrooms, etc. are to be set up.

Boys' funds, students' contribution and any other source (PTA) are some of the resources through which some of the requirements of work-experience are met.

(g) *Allotment of work-experience activities to students* : Nearly 86% male and 80% female teachers disagree with the present practice of allotting work-experience activities to students by the school principals.

Table 6

FREQUENCY DISTRIBUTION OF SUGGESTED CRITERIA OF
ALLOTMENT OF THE WORK-EXPERIENCE ACTIVITIES

No.	Criteria	Male (70)	Percentage	Female (50)	Percentage
1.	According to the interest of students	65	93.00	42	84.00
2.	According to the ability of students	61	87.00	39	78.00
3.	According to the aptitude of students	56	80.00	37	74.00
4.	Socio-economic background of students	40	57.00	—	—
5.	According to the marks obtained by students in science for the science-based activities	30	43.00	15	30.00
6.	By work-experience teachers	40	57.00	31	62.00

Table 6 shows that interest, ability and aptitude are the main criteria suggested by the sample for allotting work-experience to students.

(h) *Teachers' knowledge of work-experience* : The analysis indicates that 50% male and 60% female teachers think that their present knowledge of the subject is sufficient for them to teach work-experience. In the case of more refresher courses it was found that 80% male and 70% female

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teachers feel the need for more refresher courses in their area of activities. It is interesting to note that even those teachers (males, 30% and female, 10%) who consider their present knowledge of the subject sufficient, feel the need of further refresher courses.

(i) *Help from the professionals of work-experience activities* : Nearly 80% of male and 64% of female teachers have desired to take the help from the professionals of their activities in teaching and learning process.

(j) *TV programmes* : About 93% of male and 78% of female teachers feel the necessity of TV programmes on some special areas in their activities.

(k) *Students' progress in the work-experience activities* : Nearly 77.5% of the sample (male and female teachers) are of the opinion that students are not progressing in their allotted activities. This percentage includes schools having facilities for practical work and also those with no practical work facilities.

Table 7
FACTORS RESPONSIBLE FOR LACK OF PROGRESS

No.	Factors	Frequency Total (93)	Percentage
1.	Large number of students in an activity	84	90.00
2.	Lack of individual guidance and attention	80	86.00
3.	Lack of interest and aptitude on the part of students	74	79.50
4.	Wrong choice of the activity	70	75.00
5.	Lack of time	65	69.00
6.	No practical work	23	24.07
7.	No accommodation	20	21.50

Table 7 indicates seven most common factors leading to the unsatisfactory progress of the students in their allotted work-experience activities.

Table 8 indicates some of the factors along with their percentages which the teachers attribute to the satisfactory progress of students in their activities.

Table 8
FACTORS RESPONSIBLE FOR SATISFACTORY PROGRESS

<i>No.</i>	<i>Factors</i>	<i>Frequency Total (27)</i>	<i>Percentage</i>
1.	Learning by doing	23	85.00
2.	New activity	21	78.00
3.	Students' participation in the work	20	74.00
4.	Pleasure of making something (creativity)	19	70.00
5.	Less of theory more of practical	19	70.00
6.	Trade itself is interesting	17	63.00
7.	Useful in daily life	16	59.00

Suggestions

1. Every new venture requires more funds in the beginning. Same is true in case of work-experience. In the initial stage, sufficient funds should have been made available in advance so that by October 1975, each school must have been in a position to establish workshop/darkroom, etc. But this did not happen. The grant was made available quite late. As a result, the entire session passed without practical work in many schools. In the absence of practical work, teaching of theory constantly became boring both for students and teachers.

More liberal and advance grant should be given as to make work-experience more useful and effective.

2. Some suitable criteria of allotting work-experience activities to the students should be evolved by the principals of the schools in consultation with the work-experience teachers and counsellors.

3. The practice of teaching work-experience by the subject teachers should be avoided as far as possible. Increased number of periods and divided attention of the teachers are bound to affect their teaching. To make the teaching of work-experience more effective and purposeful, an effort should be made to have exclusive teachers for it as early as possible.

4. It has been found that the number of work-experience activities are limited and over-burdened with the disproportionate number of students. In such a situation no positive achievement can be expected. There should be some compromise between the number of students and number of work-experience activities to be introduced in the schools.

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5. There is a need to increase number of periods in work-experience or increase the duration of periods as to meet the practical requirements of the activity. This will help the work-experience teacher to find more time for individual guidance instead of giving general guidance or guidance to only a few in the practical class.

6. TV programmes in some of the specific areas of work-experience may also be arranged. These specific areas can be located in consultation with experts and the work-experience teachers.

7. The scope of the present study was very limited due to limited time and resources, at the disposal of the investigator. It is, therefore, suggested that a wider study covering the problems faced by the teachers in teaching the theory portion of work-experience in addition to the practical work may be taken up by the department concerned.

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Effect of Summer Institutes on Teachers of the 10+2 Chemistry

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Need for the Study

THE 10+2 pattern of education was introduced in 1975 by the Central Board of Secondary Education, New Delhi (CBSE), in the schools affiliated to it all over India. Since the new science syllabi under this scheme were radically different in content and approach of presentation from the current one, summer institutes were organized for the orientation of teachers to enable them to the new syllabi confidently. The discussion in the 1975 summer institutes centred around Class IX chemistry text, while the Class X chemistry units were discussed in 1976. In each of these summer institutes, huge amount of money, energy and time were invested and, therefore, an evaluation of the effect of training of the summer institutes on teachers is both timely and necessary. It was with this view that the present study was undertaken.

Pre and post-tests were designed in the present study to test the efficacy of the training of teachers. The data and results of the study were subjected to the rigours of statistical analysis. The tenability of null hypotheses was tested for significance at 0.05 level and inferences were drawn.

Purposes of the Study

The purposes of the study were :

1. To identify the gains, if any, in the achievement of teachers as a result of their intensive training in the chemistry text of Class X.
2. To test the significance of gains, if any, in the achievement test as such and at knowledge, understanding and application level separately by the teachers of the institute.

The Problem

In view of the aforesaid purposes, the following problem was identified :

Effect of the Summer Institute Training on the Achievement of Teachers Exposed to the 10+2 Chemistry Curriculum.

Hypotheses

The following null hypotheses were formulated :

At the end of a two-week training in the summer institute :

1. There is no significant difference in the achievement of teachers in the test.
2. There is no significant difference in the achievement of teachers at the knowledge level of the test.
3. There is no significant difference in the achievement of teachers at the understanding level of the test.
4. There is no significant difference in achievement of teachers at the application level of the test.

Delimitations of the Study

1. The study was limited mainly to the teachers of northern zone.
2. It was limited to new Class X chemistry units under the 10+2 pattern, adopted by the CBSE.
3. It was confined to a two-week training programme of the summer institute held at Regional College of Education, Ajmer, during May-June 1976.
4. The study was limited to the teachers—trained, untrained—graduates, and postgraduates, deputed by the CBSE.

Terms Defined

- (a) 'Achievement' refers to raw scores attained by the participants of the institute in the pre- and post-achievement tests.
- (b) 'Knowledge', 'understanding' and 'application' as categories of educational objectives relate to the meaning as elaborated by Dave, *et al.* (1975).

The classification of educational objectives in six categories, viz. knowledge, comprehension, application, analysis, synthesis and evaluation by Bloom, *et al.* (1956) was modified in the NCERT system in three broad categories, viz. knowledge, understanding and application for the Indian situation. The major emphasis in these classifications was on the 'product' of cognitive learning. Dave, *et al.* at the Regional College of Education,

Mysore, again reviewed the entire situation. They emphasized the role of different strategies to provide stimulus to evoke various 'mental processes' necessary for each category of objectives, i.e. knowledge, understanding, application and creativity. Without providing appropriate 'learning experience' for each category of objective, the evaluation was redundant. In a way this classification, known as RCEM system, laid more emphasis on 'processes' than on 'product'. The terms knowledge, understanding and application, as used in this study, refer to the RCEM system.

Sample

The CBSE directed 53 chemistry teachers of the northern zone to attend the summer institute at Regional College of Education, Ajmer, from May 31 to June 13, 1976. Out of 53 teachers, only 33 attended the institute. These teachers belonged to the schools located in Punjab, Haryana, Gujarat, Uttar Pradesh, Rajasthan and Assam. The statewide split-up of 33 teachers with their qualifications and experience is shown in Table 1.

Table 1
NUMBER, SEX, QUALIFICATIONS AND EXPERIENCE OF TEACHERS

STATE	SEX		QUALIFICATIONS					EXPERIENCE			
	No. of teachers	M	F	Untrained	B.Sc	M.Sc.	B.Ed.	M.Ed.	One yr. or less	5 yrs. 10 yrs.	Above 10 yrs.
Assam	1	1	—	—	—	1	1	—	—	1	—
Gujarat	3	3	—	2	—	3	1	—	—	1	2
Haryana	4	2	2	2	2	2	1	1	—	2	2
Punjab	6	5	1	—	—	6	6	—	2	4	—
Rajasthan	7	7	—	4	2	5	3	—	1	3	2
Uttar Pradesh	12	8	4	2	2	10	8	2	4	4	2

These teachers were pooled from various types of schools, namely, Sainik, Military, Convent, Missionary, Public, Central and others, and thus formed a heterogenous group and proved excellent from the point of view of exchange of ideas amongst the teachers.

Out of 33 teachers, only 30 were present on the opening day of the institute, when pre-test was administered. Therefore, the number of teachers in the present study is limited to 30 ($N=30$).

Tool

An objective-based multiple-choice type of unit test, consisting of 50 items, was prepared for the present study. The test items were drawn from the content of chemistry text of Class X (units 11 to 18), which the participating teachers of the summer institute are expected to teach in their schools during 1976-77 session.

A number of test items were prepared by the faculty members of the institute. These items were discussed and distributed in terms of knowledge, understanding and application level. Their suitability as a pre-test for the participants was considered thoroughly. Appropriate test items were accepted as per percentage weightage of knowledge (30), understanding (40), and application (30). The test items were chosen from all units of Class X chemistry text. Finally, the achievement test of 50 items was prepared as per blueprint mentioned in Table 2. This tool was used in the pre-and post-tests. On the basis of the expert opinion of faculty members, the test was found to have content validity.

Table 2

BLUEPRINT FOR THE ACHIEVEMENT TEST

Objectives : Content		Knowledge 28%	Understanding 42%	Application 30%	Total 100%
Unit 11	16%	2(1)	10(5)	4(2)	16
Unit 12	12%	—	4(2)	2(1)	12
Unit 13	6%	—	4(2)	8(4)	6
Unit 14	22%	10(5)	8(4)	4(2)	22
Unit 15	14%	6(3)	8(4)	—	14
Unit 16	6%	4(2)	—	2(1)	6
Unit 17	14%	4(2)	4(2)	6(3)	14
Unit 18	10%	2(1)	4(2)	4(2)	10
Total	100%	28(14)	42(21)	30(15)	100

Note : Numbers within brackets indicate the number of questions for each objective.

Procedure

The achievement test (pre-test T_1) was administered on the opening day of the summer institute to 30 participants. The teachers were not informed in advance about the testing programme, so that their achievement in this test can fairly be estimated as their past status of the knowledge of new Class X chemistry content.

On the last day of training programme, the same test (post-test T_2) was again administered to the participants. Three teachers who were not present on the first day of the institute were not considered for the post-test as well. During these two weeks of training the chemistry content, based on Class X units, was discussed thoroughly, leaving out the pre-test items. They were not even informed about the post-test. Under these circumstances, the improvement of scores on the same test can be regarded as *gain* in their knowledge of the chemistry content.

The raw scores were not corrected for guessing. The mean and SD of T_1 T_2 tests (pre-and post-tests) were computed and tested for significance by t-test at 0.05 confidence level. Similarly, the mean and SD for knowledge (K), understanding (U), and application (A) levels of T_1 and T_2 tests, taken up separately, were tested for significance by t-test at 0.05 confidence level. On the basis of t-values for total scores and scores at K, U and A levels, the tenability of hypotheses was interpreted and inferences were drawn. Since the *gains* were to be taken into account, the value corresponding to 'one-tail test' was computed. For calculating the t-value in comparing the means of T_1 and T_2 tests, the single-group method (Garrett, 1967) was used, while for t-tests of K, U and A, the difference method was employed.

Results

The tenability of all null hypotheses was tested against t-test. In case of the first hypothesis, the 4.74 value of 't' as reported in Table 3, was found to be significant at 0.01 level. Therefore, the H_0 1 was rejected. It can be said that there is significant gain in the achievement of teachers in the test.

The 4.718 value of 't' in respect of the second hypothesis as reported in Table 4, was found to be significant at 0.01 level. Therefore, the H_0 2 was rejected. It means that there is significant gain in the achievement of teachers at the knowledge level of the test.

Table 3

SIGNIFICANCE OF DIFFERENCE BETWEEN MEANS OF
T₁ AND T₂ TESTS

	T ₁ Test	T ₂ Test
Number of teachers (N)	30	30
Mean scores (M)	27.03 (M ₁)	31.06 (M ₂)
SD (σ)	4.864 (σ ₁)	5.784 (σ ₂)
Standard error of means	0.888 (σM ₁)	1.056 (σM ₂)
Difference between means	4.03	
Correlation between T ₁ and T ₂ tests (r)	0.63	
Standard error of difference between correlated means	0.8507	
	$\therefore t = \frac{4.03}{0.85} = 4.74$	
df = 29	P. 02 = 2.46	P < .01

Table 4

SIGNIFICANCE OF DIFFERENCE BETWEEN MEANS AT 'K' LEVEL OF
T₁ AND T₂ TESTS

	T ₁ Test (K)	T ₂ Test (K)
Number of teachers (N)	30	30
Mean scores (M)	8 (M ₁)	9.36 (M ₂)
Mean difference (M _D)		1.36
SD of difference (SD _D)		1.579
Standard error of mean difference (S _M M _D)		0.2882
	$\therefore t = \frac{1.36}{0.288} = 4.718$	
df = 29	P. 02 = 2.46	P < .92

The 2.076 value of 't' for the third hypothesis as reported in Table 5, was found to be significant at 0.05 level. Consequently, H₀3 failed to be accepted. Hence, there is significant gain in the achievement of teachers at the understanding level of the test.

Table 5

SIGNIFICANCE OF DIFFERENCE BETWEEN MEANS AT 'U' LEVEL
OF T_1 AND T_2 TESTS

	T_1 Test (U)	T_2 Test (U)
Number of teachers	30	30
Mean scores (M)	12.63 (M_1)	13.73 (M_2)
Mean difference (M_D)	.	1.1
SD of difference (SD_D)		2.901
Standard error of mean difference (SEM_D)		0.5298
	$\therefore t = \frac{1.1}{0.5298} = 2.076$	
df = 29	$P_{.10} = 1.70$	$P < .05$

The fourth hypothesis states that there is no significant difference in the achievement of teachers at the Application level of the test.

The t-value of 3.946 as reported in Table 6 was found to be significant at 0.01 level. Therefore, H_{04} is rejected.

Table 6

SIGNIFICANCE OF DIFFERENCE BETWEEN MEANS AT 'A' LEVEL
OF T_1 AND T_2 TESTS

	T_1 Test (A)	T_2 Test (A)
Number of teachers	30	30
Mean scores (M)	6.4 (M_1)	7.93 (M_2)
Mean difference (M_D)		1.53
SD of difference (SD_D)		2.123
Standard error of mean difference (SEM_D)		0.3878
	$\therefore t = \frac{1.53}{0.3878} = 3.946$	
df = 29	$P_{.05} = 2.46$	$P < .01$

Discussion and Conclusion

Table 3 shows that the achievement in chemistry text of the summer institute participants is significant at 0.01 level. Likewise, their achievement when computed for knowledge and application separately (Tables 4

and 6) is significant at 0.01 level, while for understanding (Table 5) it is significant at 0.05 level. These results clearly indicate that the training in the summer institute has been meaningful. The teachers have gained substantially in the items on knowledge, understanding and application. Therefore, it can be concluded that the teachers who attended the Summer Institute in Chemistry at Regional College of Education, Ajmer, should be confident to deal with that chemistry content, which they discussed during the course of the institute.

The institute had adequate provision for the discussion of the content and methodology of each unit of chemistry. This was further elaborated with demonstrations, laboratory activities, preparation of lesson plans and unit tests. All this, it appears, have helped teachers to grasp the chemistry content, which is corroborated by the results of this study as well. However, if these teachers actually handle the new Class X chemistry course well and develop interest in the students to learn chemistry as a compulsory subject, it may help the 10+2 scheme of education to settle down as the national system of education.

The obvious conclusion from this study is that more and more orientation programmes/summer institutes should be held for a large number of teachers falling within the ambit of the 10+2 scheme. Looking from the financial point of view, the average per capita expenditure in a summer institute is Rs. 500. If the scheme of summer institutes has to encompass all chemistry teachers throughout the length and breadth of the country, the estimated capital expenditure would be fantastic. Therefore, the results of this study, which although are very encouraging, should also be analysed in terms of capital expenditure, time and dedicated efforts needed for the success of the training programme.

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The School Children of Ahmedabad

An Achievement Norms Study

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Introduction

WE HAVE not yet attained the uniformity of educational standards and of educational achievement. Diverse conditions in Indian urban areas make such a uniformity unattainable. The causes of our inability to achieve uniformity are : less control by state education, parallel existence of the municipal and private recognized schools, private unrecognized educational enterprise, the socio-cultural differences associated with geographical areas, the socio-economic disparities, etc.

The school achievement is particularly known to be affected by conditions such as (i) economic, (ii) socio-cultural, (iii) literacy level, (iv) parental occupation, (v) sex-preferential attitudes and sex-linked differences, (vi) parental educational orientation, (vii) school-systems and school environment, (viii) home environment, etc.

For the above reasons, national or provincial norms can be scarcely appropriate and do have a limited value if we compare an individual child's scores with such norms. The problem is even more acute in clinical work with children who have learning difficulties. The achievement of an individual child in such a situation must be evaluated in relation to the children with whom he is competing. Therefore, there is a strong case for local norms. What we need is the norms for more narrowly defined populations and areas which are specific to sex, socio-economic status and school systems. This necessitates us to examine how local and specific we ought to be in formation of standardization sample and construction of achievement norms. There is no doubt that it would be impractical to have norms for each and every school from which children are referred.

However, the norms for a large city such as Ahmedabad would be too general to provide a useful reference. Would a specific geographical area of the city such as, let us say, the Ellisbridge area, which is geographically demarcated as being on the west side of the river, different from the rest of the city, i.e. Ahmedabad Municipal Corporation boundaries, in its population characteristics such as the density, housing, economic composition, literacy level, occupational work-activity (inferred from district-wise census, 1971) be a viable definition of the term 'local'? Is it possible to have one set of norms for Ellisbridge area which would be both representative of and applicable to the children studying in the school in that area?

Objectives

The overall objective was to study children's school achievement in relation to population variables, namely, (i) the school-systems and (ii) the sex of the children.

We sought an answer to the question : If we limited a geographical area and specific school systems, would there be any significant variations in school achievement of boys and girls or amongst the children from one school system with those from another school system?

Steps

We determined to do the following :

1. To measure children's achievement in reading, arithmetic and copying designs for both boys and girls from different school systems.
2. To compare the achievement of boys with that of girls.
3. To compare the achievement of children from one school system with those of another school system.
4. To provide norms for the studied population.

Sample

There are three broadly defined school systems in the chosen area of Ellisbridge :

1. Corporation schools run by the Municipal Primary School Board.

2. Recognized schools run as private enterprise but recognized by the Municipal Primary School Board on fulfilment of the Board's criteria.
3. Unrecognized schools run by private enterprise but are not recognized by the Municipal Primary School Board.

Due to highly uncertain and unstandardized conditions of the unrecognized schools, it was decided to exclude them.

Even amongst the Corporation schools and recognized schools there are gross language differences. There are Gujarati, English, Tamil, Hindi and Urdu medium schools. Such schools, by the very nature of medium, attract specific communities which could make the sample highly heterogeneous. Therefore, it was decided to take only the Gujarati-medium schools. To reduce the heterogeneity further, Shah's School Rating Scale was used which classifies schools between Grades A to E. Out of those, only Grade A and B schools were taken. Therefore, the sample consisted of recognized and Corporation Gujarati-medium schools of Grade A and B in the Ellisbridge area (Ellisbridge, Paldi, Ambawadi, Navrangpura). Three Grade A and two Grade B recognized schools and two Grade A and three Grade B Corporation schools formed the sample. Children were selected randomly from each of the school on the basis of age for reading and copying designs tests and on the basis of school standard for arithmetic test.

We selected 606 boys and 534 girls (total 1140 children) for comparison of girls and boys. This included 113 boys and girls of the age-group 3 to 5 years because we wanted to compare the achievement of boys and girls of that age-group for copying designs. These 113 children are excluded from the sample for the comparison of Corporation schools and recognized schools' children. It was necessary because Corporation schools have fewer children of 3 to 5 years of age and the comparison would not have been adequate. Therefore, for the purpose of comparison of the achievement of children from Corporation and recognized schools, the sample consisted of 503 children from Corporation schools and 524 children from recognized schools (total 1027) as shown in Table 1 :

Table 1
SAMPLE

	Recognized Schools			Corporation Schools			
	N	BOYS	GIRLS	N	BOYS	GIRLS	TN
Arithmetic	150	77	73	150	83	67	300
Reading	181	99	82	167	86	81	348
Copying Designs	193	105	88	186	96	90	379
	524			503			1027

Methodology

Tests : The school achievement in elementary education can be broadly divided into :

1. Skill subjects, which depend on speed and accuracy such as oral reading, mechanical arithmetic, copying of designs, etc.
2. Informational (knowledge of content) subjects such as social studies.

It was decided to measure achievement in skill subjects, namely, the reading (oral reading) and arithmetic (mechanical arithmetic). Writing skill was evaluated through copying designs and shapes.

A. READING

Reading was a test of accuracy. A child was asked to read aloud correctly. It consisted of 25 sentences arranged according to the difficulty value. For scoring purposes, the number of sentence in which the child makes the fourth error was considered as his total score. The scores were compiled chronological age-wise based on Holborn reading scale pattern. It was administered to children from 5 to 12 years of age. The test was administered individually.

B. ARITHMETIC

Arithmetic was a test of speed as well as accuracy, i.e. a time limit was prescribed and credits were given only for correct answers. It consisted of sums of addition (19), subtraction (18), multiplication (18), and division (15). The test was administered in small groups of 8 to 10 children. Each sum done correctly carried a score of 1. The total number of correct sums was considered to be the total score. The scores were compiled standard-wise based on Schonell's arithmetic test pattern.

C. COPYING DESIGNS TEST

Copying designs was a test of speed as well as accuracy, i.e. a time limit was prescribed and credits were given only for correct answers. The

test consisted of 22 designs ranged from simple shapes such as circle, triangle, square to complex shapes such as Kneeker's cube, tapered box and three dimensional star. The test was administered in small groups of 8 to 10 children. A score of 1 was given for each correctly copied figure. The total number of correctly copied figures was considered to be the total score. The scores were compiled chronological age-wise based on Beery Butemicka's visuomotor integration test pattern. Elaborate criteria for correctly copied figures were provided for scoring purposes. Tests were constructed in Gujarati for the purpose of the study and were finalized on the basis of pilot studies. All the three tests were self-validated by the content and the definition. None of the tests took more than an hour to complete. The tests were administered during the winter, i.e. the final term of the academic year.

Variables

The attempt to minimize the population variation was made by taking the following steps :

1. Selection of a limited area.
2. Elimination of the other media school and of minority community schools.
3. Inclusion of only Grade A and B recognized and Corporation schools.
4. Elimination of the unrecognized schools.

However, it is to be noted that influences could only be minimized to a very modest extent. Though the geographical area is demarcated but it is expected that some children outside the catchment area will also attend these schools. We have not ascertained whether the characteristics of the 'universe' are so specified. The socio-economic variable is indirectly linked with school-system variable. The socio-economic composition of children coming from recognized schools is likely to be different from those of Corporation schools as was indicated by Ahmedabad Primary School Board Survey, 1972. According to the survey in Ahmedabad, more parents of Corporation schools' children had less income and lower education and they spent less money on their children's education when compared with the parents of the children of recognized schools.

Analysis and Results

The mean scores on reading, arithmetic and copying designs tests of the children of recognized schools were compared with those of Corporation schools. Reading, arithmetic and copying designs' scores of boys were compared with those of girls. The scores were analysed on standard computer programme for t-test application.

When the scores of boys and girls were compared for arithmetic and copying of designs, no significant differences were observed in the achievement of boys and girls in these two skills. But on the reading test, girls were observed to have achieved significantly higher scores. The differences were significant at .02 level as shown in Table 2.

Table 2
COMPARISON OF BOYS' AND GIRLS' ACHIEVEMENT SCORES

	BOYS				GIRLS			Value	Level of Significance
	TN	N	Mean Achievement	SD	N	Mean Achievement	SD		
Arithmetic	300	160	19.64	15.35	140	12.29	14.30	0.184	NS
Reading	348	185	13.326	6.352	163	15.049	6.574	9.487	.02
Copying Designs	492	261	11.573	6.640	231	11.996	6.719	0.703	NS
	1140	606			534				

When the scores of the children of Corporation schools and/or recognized schools were compared, highly significant differences between the two groups were observed. The children of recognized schools were found to have achieved significantly higher reading, arithmetic and copying of designs scores as compared to those of Corporation schools. These differences for all the three tests were significant at .001 level. The standard deviation for arithmetic is nearly as high as the mean for the Corporation schools children. Only further research may reveal if this is due to a greater variability in Corporation school children's arithmetic achievement. When scores were analysed at each chronological age for reading and copying designs, the following results were obtained.

Reading : At each age from 5 to 12 years, the children of recognized schools had significantly higher scores than those of the children of Cor-

Table 3

COMPARISON OF CORPORATION AND RECOGNIZED
SCHOOLS' ACHIEVEMENT SCORES

	CORPORATION SCHOOLS			RECOGNISED SCHOOLS			<i>t</i> -value	Level of Significance
	<i>N</i>	Mean Achieve- ment	<i>SD</i>	<i>N</i>	Mean Achieve- ment	<i>SD</i>		
Arithmetic	150	13.992	12.552	150	25.440	15.129	6.320	.001
Reading	181	12.459	6.545	167	15.674	6.085	4.756	.001
Copying Designs	289	13.38	*	213	14.56	4.56	3.47	.001

poration schools except at the age of 11 years. Further, we compared the boys and girls within their own school system. The girls in recognized schools obtained significantly higher scores than those of the boys only up to the age of 9 years. The girls in Corporation schools obtained significantly higher scores at younger age as well as at older age.

Copying of designs : Scores of the children from Corporation and recognized schools were compared at each chronological age from 6 to 13 years. Children from recognized schools obtained significantly higher scores at 6, 8, 12 and 13 chronological years.

Arithmetic : Mean scores of children from Corporation and recognized schools were compared at each school standard (I to IV). Children from recognized schools obtained significantly higher scores than those of Corporation schools' children at each school standard.

Discussion

Even in a geographically limited area, highly significant differences were observed in the achievement of children from recognized and Corporation schools. These differences were maintained at different ages and school standards. We had hoped that by selecting high-grade schools (Grades A and B) from both school systems, the extraneous variables which can affect school achievement would be minimized to some extent. However, the selectivity of pupils, compulsory education, pre-primary schooling, policy of pupils' promotion, educational orientation and the life, coupled with socio-economic disparity are bound to exercise influence over the school systems and children's school achievement. Thus the population in the two types of schools is different and the differences may be attributed to school systems variable, socio-economic variable (the latter

was indirectly studied), and many other variables which are not identified and controlled in this study. Whether the level of children's achievement in Corporation and recognized schools elsewhere will be the same as of their counterparts in Ellisbridge is an open question.

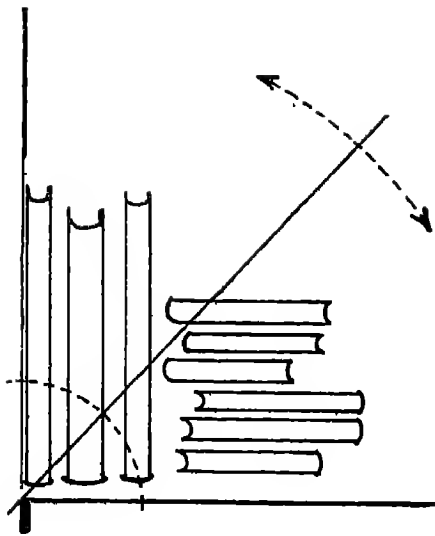
Conclusion

Ellisbridge, a geographically demarcated area, occupying approximately one-third of the total area of the city, having approximately one-seventh of the total city population, stands out against the rest of the city for its higher rate of literacy, lower density, better housing condition and advanced occupational work-activity. Even in this selected area, the school-going population was observed to be highly heterogeneous. On the basis of the findings of the study, separate norms are to be provided for children of Corporation and recognized schools for reading, arithmetic and copying designs. Separate norms are to be provided for boys' and girls' achievement in reading.

Suggestions for Further Work

The following hypotheses can be generated which deserve further investigation :

1. The level of school achievement of children from recognized and Corporation schools of Grades C to E (Shah's school rating scale) will be different from that of the recognized and Corporation schools of Grades A and B.
2. In another area of the city, let us say, the walled city area (east side of the river), the level of school achievement of children from Corporation and recognized schools will be different from that of the Corporation and recognized schools of Ellisbridge area.
3. The level of school achievement of children from unrecognized schools will be different from that of the children from Corporation and recognized schools.
4. Children's school achievement is related to school systems rather than to geographical areas and other population characteristics. In other words, the norms of Corporation and recognized schools of Ahmedabad Ellisbridge area will apply to the Corporation and recognized schools of other cities such as Baroda, Bhavnagar, Rajkot, or any other city of Gujarat.



Book Reviews

Human Characteristics and Learning

Benjamin S. Bloom, McGraw-Hill Book Company, New York, 1976

LEARNING is essential for the enhancement of human competence and advancement of his society. The accomplishment and adjustment of human species depend upon learning. Human civilization has generated schools as seats of learning which are next only to homes. In schools, learning process is organized and channelized to shape young minds in the society. Without a good system of education the quality of the minds and even the quality of the people of a society will not improve. Thus, school learning is the basis for the progress of a society.

Our system of education is designed to produce people who are capable of dealing with words, concepts and mathematical or scientific symbols which are necessary for the success of a technological society. Genetic variabilities and environmental diversities contribute to individual variations of human characteristics and this, in turn, is bound to have its influence on the learning capacity of the individual.

Bloom in his book exercises special emphasis on equality of learning outcomes in spite of their difference in heredity, environment and intelligence level of the students. With the evidences gathered from micro, macro, short-term and longitudinal studies, the author has successfully

presented a comprehensive picture of various factors contributing to school learning and under eight chapters : (1) Individual differences in learners and learning, (2) Learning unit, (3) Cognitive entry behaviours, Affective entry characteristics, (5) Quality of instruction, (6) Affective outcomes of school learning, (7) Summary of the parts of the theory and their interrelations in selected studies, and (8) Conclusions and implications.

Theory of school learning is the central theme of this book. In the first chapter the author has discussed about the theory which attempts to explain individual differences in school learning and also to determine the ways in which such differences may be altered. The theory is based on two assumptions : (i) Each learner begins a particular course with a history which has prepared him differently from other learners with regard to the learning to be accomplished. (ii) It is assumed that the characteristics of the learner as well as the quality of instruction can be modified to affect a higher level of learning for individuals and groups.

The theory has three major components : Cognitive entry behaviours, affective entry characteristics and quality of instruction. The central thesis of the book is that variations in cognitive entry behaviours, affective entry characteristics and quality of instruction will determine the nature of outcomes, that is, the level and type of achievement. The author argues that if these three are properly attended it should enable schools to approximate an error-free system of education. He has discussed the mastery learning procedure which begins with the notion that most students can attain a high level of learning—if instruction is approached sensitively and systematically, if students are helped when and where they have difficulty, if they are given sufficient time to achieve mastery and if there is some clear criterion of what constitutes mastery.

Learning unit is the focus of the second chapter. Unit is a learning task which contains a variety of ideas, procedures or behaviours to be learnt over a relatively short period of time. A learning task may include complex or difficult educational objectives as well as simpler and less difficult objectives. Learning tasks do tend to be grouped by subjects, courses or fields. The different learning tasks do not require each other and they could be learnt in many different orders. There are no necessary relations among the learning tasks. Learning of one task does not necessarily facilitate the learning of other tasks, but in the sequential series of learning, the student who has difficulty in learning the first task may perceive the remaining tasks in the series as difficult and may react to them in the same manner. Thus, his affect towards the series of learning tasks may be affected by his experience with the early tasks in the series.

The third chapter represents one aspect of the history of the learner which has powerful effects on his subsequent learning. On the basis of the evidence obtained by research studies the author makes it clear that there is strong positive relation between the cognitive entry behaviours of a student and his achievement in subsequent learning tasks.

The prerequisite learning needed for a particular learning task has been termed as cognitive entry behaviours. Here the author has referred to those prerequisite type of knowledge, skills and competencies which are essential for the learning of a particular new task or set of tasks. This assumption is based on several conditions :

1. Attributes of the students prior to the learning task have much to do with the learning of new tasks.
2. Achievement variation at the end of the year is highly related to their variation in achievement prior to the beginning of the year or term.
3. School learning task typically represents some developmental sequences in which later tasks assume some prior learning on the part of the students.
4. It is impossible to conceive of any learning task which is built on some prior learning.

The underlying assumption of this chapter is that if all the students entered a course with equal relevant prior achievement their variation in achievement of the course objectives and content would be much reduced. It is also assumed that cognitive entry behaviours can be altered to a large degree by altering the learning tasks and by changing the objectives and content of a course.

The author is of the opinion that there are a number of common entry behaviours for the courses at junior and secondary schools, like verbal behaviour, arithmetical and mathematical processes, logical reasoning process, language development and writing competence, etc. When the general set of entry behaviours are at a high degree of competence it will make students' subsequent learning more effective (Gagne and Paradise, 1961), which in turn determines the cognitive entry behaviours for the next course of learning tasks. There is a repeated cycle of cognitive entry behaviour, learning task and achievement which have long determinism over much of students' school learning.

Bloom has given much importance to the cognitive entry behaviours as far as the school learning is concerned. He is of the opinion that the intelligence tests label and classify the student, while measures of the

essential cognitive entry behaviours enable teachers to determine what the student needs to learn a particular set of learning tasks. Studies reveal that the intelligence measure accounts for about 25 per cent of the variance while the achievement measures account for 50 to 64 per cent of the variance on subsequent achievement measures.

The other aspect of the history of learner which has relatively powerful effect on his subsequent learning has been discussed in the fourth chapter of the book. The author has estimated that affective entry characteristics can account for up to one-fourth ($r = +.50$) of the variance on relative cognitive achievement measures. It helps to determine the extent to which the learner will put forth the necessary effort to learn a specific learning task. In turn, the students' effectiveness in learning a particular task will affect his motivation or effort on a subsequent learning task which he perceives as related to the previous task.

Here affective characteristics have been regarded as a complex compound of interests, attitudes, and self-views. Learning should be much easier where the student enters a learning task with enthusiasm and interest. It is also possible that same student may approach one learning task with positive affect and another with negative affect. Affective characteristics may not be same at the beginning as well as at the end of the learning tasks because one is the result of the history whereas the other is the result of the experience of the learner.

The student's affect may be in part determined by his preception of the relation between the present task and the set of future goals, purposes or objectives he has in mind, the difficulty level of the task and his perception of previous failure or success in similar tasks.

The subject-related affect is specific to a set of learning tasks that are in some way related to the student's perception. The student's view of himself is likely to be most directly influenced by the frequent judgements that he receives in a school about himself as a learner and especially those judgements made by teachers and peers in the school and parents and siblings in the home. The academic self-concept is the strongest of the affect measures in predicting the school achievement and it is an index of the students' perception of himself in relation to the achievement of the other learners in his class. It is undoubtedly based on the feedback he receives from grades, tests, teachers, parents and peers about his school work.

The quality of instruction is the third independent variable of the theory which Bloom has taken up to discuss in the fifth chapter. Cues, participation, reinforcement, feedback and corrective procedures are considered to be the major characteristics of instruction. On the basis of

the research evidences the author writes that the qualities of cues, participation and reinforcement can account for at least 20 per cent of the variation in student learning. In general, the quality of instruction can account for at least one-fourth ($r=+.50$) of the variance on relevant cognitive achievement measures.

The quality of instruction can be improved so that a larger portion of students attain a level of mastery with consequent changes in their subsequent cognitive entry behaviours and affective entry characteristics. Similarly, poor qualities of instruction can have negative effects on current as well as subsequent learning. If this instruction is sensitive to the student's previous history it is likely that favourable school conditions can enable most students to learn well to develop more effective learning processes and to get increased satisfaction from their learning. The quality of instruction is a major determiner of who will learn well—the few or the many ?

In the previous three chapters the author has discussed about the three independent variables of the theory while in this chapter he has discussed the affective outcomes of school learning, that is, the dependent variable of the theory. The intent of the author is to emphasize the likelihood that the affective consequences of school achievement under more favourable conditions can be very different from some of the negative affective consequences.

Each of the task in a series of learning tasks takes on a special meaning for the student which is related to his sense of adequacy in accomplishing previous tasks in the series. The student's confidence in himself with respect to the type of task is enhanced or reduced by his perception of his performance over the previous tasks. This general result will be found in each subject or type of learning experience. An accumulation of experiences with learning tasks regarded as similar, gradually becomes stabilized for the student. Thus he views the next task in the series positively, negatively or indifferently. This assumes that adequacy or inadequacy of students is defined in terms of their standing in the upper or lower portion of the local distribution of marks. Success (or adequacy) in a school subject opens it up for further consideration and use. In contrast, failure (or inadequacy) in a subject may effectively close this subject for further consideration. This is dependant on the local definition of success and failure relative to other students in the class or school.

In all the previous chapters the author has discussed about the learning outcomes of independent variables like cognitive entry behaviours, affective entry characteristics and quality of instruction manipulated separately. Whereas in the seventh chapter he has discussed the combined

effect of two or three variables manipulated together. Studies indicate that the effect of positive entry characteristics (cognitive+ affective) and improved quality of instruction is to increase the relative learning effectiveness of the mastery of students, while the less positive entry characteristics and less quality of instruction decreases the learning effectiveness when they encounter successive new learning task in a sequential series.

On the basis of research studies the author states that student-learning effectiveness can be increased or decreased by positive or negative changes in entry characteristics (cognitive+ affective) and the quality of instruction is a major causal factor in producing these changes. Degree of involvement, time on task, rate of learning and level of achievement on critical learning tasks are all symptoms of these changes in learning effectiveness. The differentiation between good and poor learners or fast and slow learners tend to be reduced to a point where it is difficult to measure in hours or minutes. Studies reveal that the intricate combination of cognitive+ affective entry characteristics+ quality of instruction produce greater effect in school learning, but this has been touched only at the surface level whereas the separate contributions of the variables are relatively clear.

The theory of school learning has been presented as a causal system of the relations between the selected variables and the selected learning outcomes. That is why, it can be used to predict what will happen under particular conditions. It offers explanations for why things happen the way they do, and it states what will be the results if particular student characteristics and instructional conditions are altered in specific ways. In effect, the theory states that if educators want student-learning outcomes of a particular type, then they must produce certain changes in the student and/or the instructional conditions. A system of feedback to the teacher and the student can reveal the errors in learning shortly after they occur, and if appropriate corrections are introduced as they are needed, the educational system can be a self-correcting system so that errors made at one time can be corrected before they are compounded with later errors. The self-correcting system of schooling can become a minimal-error system of education with consequent positive effects on the student's affective and cognitive characteristics.

The central issue is, what is worth learning in the schools and the means by which the student's motivation and capabilities are fully engaged in the learning process. One implication of the theory is that equality of learning outcomes can be a goal of education rather than equality of opportunity. A second implication has to do with when and where

inequality for treatment is to be preferred to equality of opportunity. Bloom stresses the importance of help and support in early phases of the learning rather than in the later phases. Remediation too late in the course is not likely to have as much effect as feedback and correctives at earlier stages.

The third implication has to do with which parts of the curriculum are most vital for equality of outcomes. For example, verbal ability and reading competence are important because they affect the student's learning of most subjects in the curriculum (Bloom, 1974 and Thorndike, 1973). Other important parts are arithmetical and mathematical types of competence, certain types of reasoning and problem-solving abilities, skills in using libraries and other information sources, skills of organizing and presenting arguments in the school setting. The identification of such learning is important in determining where equality of outcomes or at least minimal level of competence is desirable for all students.

The theory has been clearly explained by giving research studies with graphical illustrations and tables as evidences. The author has also given references of the quoted studies in the book.

Though the author has explained all the possible factors contributing to learning, he does not envisage the role of memory in the process of school learning. While elaborating the theory of school learning the author could have elucidated the importance of retroactive and proactive inhibition in learning any task.

To sum up : The book is useful for teachers and curriculum workers. This has far-reaching implications for teacher-training, selection methods, organization of the system of education and the development of new curriculum and instructional system. This is a good reference book for research students who are working in the field of educational psychology, specially in the field of learning.

K. SUDHA RAO



New Strategies for Educational Development : The Cross-cultural Search for Non-Formal Alternatives

Cole S. Brembeck and Timothy J. Thompson (Eds.), Lexington Books :
D C Heath & Co., Lexington, Mass., Toronto, and London, 1973, xviii+219

SINCE the 1960's people started speaking about education, and researchers dealt with several aspects of education, e.g. economics of education, politics of education, sociology of education, etc. But most of the research was confined to formal education—at school. Experience shows that formal schools are not an adequate and efficient means of meeting the educational needs. School system requires huge physical and monetary resources. Major part of the school system requires full-time pupils. The opportunity cost of the pupils is not insignificant. Further, the school system is not able to relate effectively education with productivity, skills and knowledge. All this does not mean that formal schooling is full of weaknesses and it should be thrown out. On the other hand, it suggests that formal education needs a complementary education. The inadequacy and inefficiency of the traditional system baffled the minds of the educationists for a long time. Of late, a strong argument is being formed in favour of non-formal education. Non-formal education is not a new phenomenon. In fact, it is older than formal education. Not only it is older, but it has been more prominent than formal education, since most of the skills we possess have been learnt outside the formal schools. But educationists have started thinking of non-formal education very recently. The book under review is a rich addition to the budding field of research. A short review of this kind may not do justice to the rich collection of seventeen papers running into 219 pages.

Out of the 17 papers, 14 were originally presented at seminars on non-formal education held by the Education and Human Resource Development Panel of the South-East Asia Development Advisory Group of the Asia Society, New York at Washington D. C., Penang (Malaysia) and at Seoul (Korea) in 1971. These papers are classified into five parts. Apart from a general introduction to the book by Brembeck, each part is also preceded by a useful introduction.

The first part, consisting of three papers, is devoted to an explanation of the nature and the character of the non-formal education. In the first

paper 'Human Resources and Non-Formal Education', Harbison's treatment to the problem is somewhat different. He defines it as "the most unsystematic of all the systems", and as "the responsibility of no single ministry" (p. 5). Further, his way of examining merits and the weaknesses of non-formal education as against formal education may mislead the reader to feel that non-formal education is competitive to formal schooling, replacing the formal education system altogether. However, at the end, Harbison checks himself and discusses how non-formal education has great potential for improving the formal education system. Callaway presents a useful description of the main features and the types of out-of-school education and its relation with formal education in Chapter 2. Anderson defines non-formal education as "that which is conducted outside the conventional 'academic' or college courses" (p. 25) and views training to be an important component of it. Speaking about planning non-formal education he says: "...It is desirable to set modest bounds to our expectations from formal school (and) a due modesty on the aspirations for formal school encourages a much more modest proliferations of non-formal ways of learning" (p. 34). Then the supply of skills of the total educational system can be coordinated with demand for skills by the same means. Anderson's approach is realistic even though many (like editors) cannot welcome it.

The second part 'Locating Educational Functions', consists of three interesting papers. 'Are Formal Schools the Best Place to Educate?' by Grandstaff is concerned with the problem of location of education whether formal schools or non-formal centres? He concludes that needs of social groups determined by the objectives for education, which in turn, according to him, are determined by the location of the educational programmes—a conclusion which is too difficult to agree with. Rather, it should be the other way—the objectives of education should determine the location. Brembeck in his paper discusses the strategic uses of formal and non-formal education. He finds that the formal school has been capable to produce a wide range of behaviours required by the modern society. The difficulty arises when we want it to do something it is not good at. So, he concludes that "it is time to seek other means that are naturally good at doing them better" (p. 63). The last paper in the second part is devoted to a discussion on the need to enlarge the scope of educational planning to include non-traditional educational activities also. Further, illustrating a particular case of non-formal education, namely, youth service programmes in Africa and the Caribbean, the author Pualston presents the actual procedure of planning non-formal education.

The three papers in the third part by Alex Inkeles, Waisanen and Ted Ward, *et al.* are concerned with the planning aspects of non-formal edu-

cation. Inkeles in his paper 'The Role of Occupational Experience' answers to several of his critics who do not agree with his former hypothesis that factory forms one of the major centres of non-formal education. The factory of the 'ideal-typical' form, he reiterates, "exemplifies efficacy" (p. 93); "the principle of planning is exemplified in the very lay-out of the factory" (p. 94); and the principle of the time as well; and it also teaches how to respect "the right of subordinates and of their individuals of the inferior standing in the hierarchy of status" (p. 95). Thus the factory serves as "a school even in those subjects generally considered the exclusive preserve of the classroom" (p. 97). In Chapter 8, Waisanen giving an empirical evidence from Costa Rica observes that the success or failure of non-traditional education depends upon the receptivity of the individual and the nature of the programme itself. Ted Ward, John Dettoni and McKinney present a system approach to designing an effective programme for non-formal learning. Their paper is concerned with the basic problems of planning the programme.

Some more issues with respect to planning non-formal education have been dealt with in the fourth part. James Guyot devotes his attention to the effects of non-formal education (or to say in his own words, 'deformalized education') like the employment benefits, political consequences, effects with respect to efficiency and equality, effects on investment, and effects on the relations between educational credentials and qualifications for jobs. Successful implementation of any educational plan depends upon the elements of the plan. Hilliard outlines the various components of the educational programme in Chapter 11. Philip Coombs, after reviewing the present state of educational planning and identifying the various problems, presents an outline of the actual procedure of planning non-formal education. One of his interesting conclusions is that the integration of formal and out-of-school education is advantageous to both, and also to the national development. Hardin considers the problem of economic evaluation of non-formal education programmes in Chapter 13. The first half of his paper is devoted to reviewing evaluation studies on the non-traditional education programme in the U. S; and the latter half to the procedure for evaluation in growing economies. He argues for creating international institutes for programme evaluation, which help poor nations to learn from the rich nations where the evaluation of non-formal education programmes has already been done, and to avoid going through "a long process of isolated trial and error", and to "put their intellectual resources to productive use" (p. 168):

The last part of the book consists of four case studies of Korea (Hyun Ki Paik), Peru (R. G. Paulston), Columbia (F. Harbison and G. Schvez)

and Appalachia in Kentucky (W. H. Griffin). These case studies focus on a variety of aspects of non-formal education such as its relevance, private and social benefits, costs, planning, financing, relation with formal education, etc.

On the whole, the book is a rich volume. A select bibliography and an index at the end would have enhanced its worth further.

JANDHYALA B. G. TILAK



Modification of Teacher Behaviour Through Microteaching

N. L. Desajh, Sterling Publishers, Pvt. Ltd., New Delhi

IN PURSUANCE of the need of increased emphasis on student teaching in the teacher education programme, the decade of seventies is marked by vigorous research and implementational attempts on strengthening student teaching programme. Microteaching is one of such training strategies which has caught attention of teacher-educators. In India, as far as it is known today, it started with G. B. Shah, in 1969-70, in the Centre of Advanced Study in Education, Baroda (CASE), followed by a team of researchers under the stewardship of B. K. Passi for over more than five years. Simultaneously, experiments, with sophisticated gadgets, on microteaching were on in the Technical Teachers' Training Institutes (TTTI) at Calcutta, Chandigarh and Madras. Microteaching movement has however gathered momentum at the instace of NCERT since it began its workshop in 1975 where the author, Dr. Desajh, was one of the participants; and he came in contact with Roy Harris and Jack Duthie, the British experts whose influence is visible in the present treatise. In the following years, NCERT conducted three more workshops with the expertise of B.K. Passi and thus trained more than 50 teacher-educators from all over the country. As it stands today, besides about a dozen of studies completed at CASE, a couple of studies in the TTTI's, there are nearly 20 reports on the NCERT

operated programme. This precisely indicates the status of Indian research on microteaching. One would, however, note the paucity of Indian literature. Besides a few articles published in magazines and journals, there are only two books : *Microteaching in Teachers' Education*, by Passi and Shah (1974) and *Becoming Better Teacher : Microteaching Approach* by Passi (1976). The present book is the third in the series and hence an important addition to the Indian titles on microteaching. It has one important departure—in this case the microteaching has been done using CCTV while in rest of the cases it is without this gadget.

Indian researchers having no experience of CCTV and video-tapes would enjoy going through the first chapter, specially the few pages devoted to the description of equipments. It has a further score : the layout of microteaching labs with and without CCTV. Although very brief this would be helpful to the organizers. Rest of the chapter is devoted to various types of interaction analysis systems. These are apparently useful for the beginners but for the lack of details on any system except for Roy Harris'. While the author has pointed out Flander's system as 'quite famous all over the world' (page 8) one would doubt if there is any system, like 'FIAT' (or it is FIACS).

The second chapter is devoted to skills of teaching. The author, without reference to any particular list, has provided a list of 15 skills and given detailed description of each of them. These skills are, by and large, commonly used by researchers in Stanford, Far West Laboratory, Stirling, Lancaster and CASE. A comparative study of these systems would have, however, been more interesting. A special mention was needed of such a list developed at CASE which has been developed on the basis of Indian classroom teaching analysis; the need of which the author has himself mentioned : "In fact there is a need for analysis of this process of teaching so as to determine the nature and number of skills involved" (p. 31). The preformas for evaluation of skills provided in this chapter would be very useful for those who want to experiment on this approach. The proformas, if included in the appendix, would increase the readability of the chapter.

In the fourth chapter, one looks with appreciation the grip, the author has on the literature on microteaching in the West. It is disappointing to see the huge and important work done by Indian researchers blacked out in this volume. While there are nearly 30 research studies in India on microteaching even before the book was probably in press, the author could lay his hands on hardly seven except for his own work. It is surprising to see the reference to NCERT workshops even missing. One is afraid if it is the same nostalgia for western research and tendency to

denounce Indian efforts is still haunting Indian research experts. In fact a more balanced review of Indian and Western research would have been more reasonable.

Behaviour modification researchers are essentially experimental in nature. The research design in such cases require a tight framework and judicious use of statistical techniques for the purposes of deriving conclusions and generalizations, however, limited. Well, this is what could be expected from such a title, but not what could be found here. Probably, it would be difficult even to imagine that the author had matter on his experiment on modification of teacher behaviour through microteaching to be reported in hardly five pages (105-110). The findings are presented in a casual manner, viz. 'an all-round development was noticed'. Research findings could be presented in a more specific and scientific manner. Rest of the chapter has been filled up by Evaluation Proforma.

The author has added a rich bibliography at the end of the book. The author's references could be better updated beyond 1972 in case of western research. Indian research, as stated earlier, needs fresh consideration and incorporation. More current lists are, however, available at CASE, Baroda as well as in the Department of Teacher Education, NCERT. The topic of microteaching itself which is a recent craze, a foreword by Dr. Jack Duthies and a fine get-up add to the value of the book. It would be a valuable addition for a researchers in a library at a moderate cost of Rs. 35.00

M. MUKHERJEE



The Oxford Progressive English-Hindi Dictionary

S. K. Verma, R. N. Sahai, Oxford University Press, New Delhi, 1977, pp. 357, Rs. 10.00

DICTIONARIES are academic aids. They help people to check and improve their vocabulary. But beyond these, they open up a world of knowledge both in terms of concepts and cognition. A bilingual or a multilingual dictionary serves a dual function—it assists an individual acquiring greater hold on the language which he knows and helps in the immaculate use of words in the language which he knows but imperfectly. By themselves

dictionaries are least controversial unless they deal with a polemic subject and then also when they take a partisan view in certain entries. To say the least, a dictionary is always welcome particularly when it has been prepared by a team of scholars and is produced with competence. And if the cost of publication is reasonable, the readers tend to have a favourable bias toward it. The present work foots the bill in full measure.

Numerous dictionaries in India exist which have the same bilingual character. The first very popular one was by Bhargava. A difficulty arose when Hindi came to be used as the medium of instruction at the post-graduate level. We wanted more and better and also specialized bilingual dictionaries. The Government of India had to enter the field for the preparation of technical vocabulary in Hindi. Sets of such specialized dictionaries are available but not all are really easily usable. Dr. Raghu-vira made his contribution and so did Rahul Sankrityayan and others. A lacuna still persists. We have no exhaustive bilingual dictionaries like the ones in English, be that Websters, Funk and Wagnells or Chambers, etc.

It is a welcome sign that OUP has entered this field also. One hopes they would be a little more ambitious than the present and prepare sets of dictionaries that are usable by both experts and people alike.

It has an introduction like any other work of the type and offers guidance for pronunciation. Daniel Jones has been taken as the model. Each word carries with it knowledge of the parts of speech. Phonetic symbols have not been used because the authors say the readers will then have to learn the third sign-structure.

There is a small section which deals with the use of the present dictionary. Though there are drawings which appear complicated, in fact they are not at all complicated. Pronunciation symbols of consonants have also been detailed.

One thing which may be specially mentioned in this connection is that the Hindi equivalents of English words are easy and usable. There are about 9,000 head-words and about 300 drawings which explain terms otherwise not easily understandable. There are, however, limitations of space, art and selection. But one could overlook all these minor points considering the cost of the volume.

R. P. SINGH □

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Educational Involvement in India's Poverty

JAMES MARK LEWIS

SCHOOL OF EDUCATION

CATHOLIC UNIVERSITY OF AMERICA

WASHINGTON D.C., U.S.A.

No one can really say that the school cannot win its difficult battle with the street; it has never really tried.

—CHARLES SILBERMAN

Poverty in India is well known. It is so common that it has been, in the past and present, commonly unattended to. The poor now are angry, their resentments to the inequalities of the past have been stirred to a point of action—social, civic, economic and political. With the result the people and politicians are presumably fighting to save its victims, the poor.

Assuming that increased education with marketable skills will eventually alleviate poverty in India, the present paper attempts to build an action-oriented, long-range instructional model. While doing so, it takes into account research findings from India and abroad on the effects of poverty on the instructional system. An attempt is also made to combine all the ramifications of poverty—economic, political and social—within a workable educational structure. Such a model, it is felt, is required for any systematic planning. At least a beginning has to be made now, if the poor of India have to reach the promised land.

April 1978

WHO IS POOR IN INDIA ?

POVERTY can rarely be defined. It has been described instead, by economists, educators, sociologists and political scientists. Economists relate poverty with unemployment and under-employment resulting in low income. Educators tend to relate poverty with illiteracy. Sociologists describe poverty as culture with its pattern emerging in response to a sociologically arranged interactions and concomitant conditions. It is also conceived as a set of circumstances and ecological arrangements within which the poor find themselves placed. Politically speaking, the poor remain poor because they lack power. If one were to look at their income levels, types of jobs, conditions of living, educational and recreational facilities available, degree and types of illness and statistics on marital disharmony, desertion and court records, one can draw a clear distinction between the rich and poor in India.

Being socio-economically disadvantaged, therefore, is no simple matter of deficit, of suffering 'a cultural avito-minosis', that can be dosed by simple inputs of compensation. In India, it is a complex of circumstances at the centre of which is a family head jobless or with an unremunerative job; who, although not ignorant of the paths of economic stability is unable to conceive of a reasonable set of actions that will bring him stability. In spite of much human bravura to 'being at the bottom' with little by way of a long-range perspective or hope, the poor man feels alienated by a sense of ethnic separation from the main culture. It is this sense of utter powerlessness that poverty sub-culture produces, no matter how moving its by-products are, generates instability in Indian society and unfulfilled promise in human beings.

NEXUS BETWEEN POVERTY AND EDUCATION

It is now accepted by all quarters that education is a powerful instrument of modernization, bringing about desirable changes among men. It can provide all the premises of modernization. Education, for example, can provide rationality, development and development planning, rise of productivity, rise of levels of living, social and economic equalization, improved institutions and attitudes, national consolidation, national independence, democracy at the grass-roots and social discipline. Briefly speaking, in a developing nation, educational institution is virtually the only legitimate channel of upward mobility for young people from families of very low socio-economic status.

However, there are some economists who are skeptical about education's

role in poverty alleviation. They argue, quite convincingly, that in capitalist countries education, by itself, is not a *sine qua non* for higher income. To quote,

Far from mitigating inequality, the educational system has, in the advanced capitalist countries, served to legitimize the prevailing inequalities and thereby to facilitate the perpetuation of the very institutions which generate inequality.. Educational system perpetuates existing economic inequalities since the ostensibly objective and meritocratic entrance and promotion standards favor the economically advantaged.¹

The hard-core economists who advocate the above argument also provide evidence that cognitive attainment is relatively unimportant in explaining why education leads to higher income and occupational status. Neither achievement level nor intelligence levels are said to be very important. For example, in a life-time study of earnings among 1,827 males who were in Grades VIII or IX in 1935, for instance, Rogers² found that the economic return of a year of schooling was same for persons of all IQ levels.

On the other hand, research has also shown that "pay-off rate is high enough to justify the encouragement of heavier flows of students through schooling". Empirical evidence³ is available to indicate that larger role of education against the battle against poverty will result in higher pay-off rate. Thus, in spite of these apparent contradictory results of pay-off rates for extra education, economists themselves admit that "expanding education in the less developed countries is an important and indeed necessary part of

¹Samuel Bowles, Herbert Gintis, John Simmons, "The Impact of Education on Poverty—The U.A. Experience", *International Development Review*, XVIII, 2, 1976, 2/2.

Other evidence for similar line of argument can be found in Asim Dasgupta, *Education, Wealth and Income Distribution*, Wash. D.C., World Bank, 1974. Leigh Alexander, *Determinants of School Achievement in Developing Countries*, Wash. D.C., World Bank, 1974. John Simmons, *Education, Poverty and Development*, Wash. D.C., World Bank, 1974. Bowles Samuel, Gintis Herbert, *Schooling in Capitalist America*, New York, Basic Books, 1976.

²Daniel C. Rogers, "Private Rates of Return to Education in the U.S.: A Case Study", *Yale Economic Essays*, Spring, 1969.

³See Committee for Economic Development *Raising Low Incomes through Improved Education*, (CED/1965), 16-17. Theodore W. Schultz, "Investing in Poor People: An Economist's View", *American Economic Review*, IV, 2, May, 1965, 515-16, and Michael S. March, "Poverty: How Much will the War Cost?", *Social Service Review*, XXXIX, June, 1965, 141-56.

the development strategy".⁴ Though education, as a poverty alleviation technique, is an expensive decision alternative, the economic view itself is rather one-sided. To look at poverty alleviation economically without social, cultural and political aspects, is like crossing the road with blinkers on.

Education has other advantages too. The outstanding phenomena—inter-generational effects and supramarginal changes—according to Ribich⁵ seem to increase the anti-poverty potential of education as compared to other types of policy action. Other non-pecuniary outcomes of education are the reduction of dependency or the avoidance of 'handout' connotation, psychic returns—attitude changes, differences in outlook, life-style, etc.—equality of opportunity, externalities like reduction of juvenile delinquency, and the economic growth.

In India, improved education with marketable skills is perhaps the best tool for poverty alleviation. The purpose of education is not merely to increase per capita income, but to reduce social, political by-products of poverty as well. This is succinctly expressed in the Education Commission Report (1966):

Education should be developed so as to increase productivity, achieve social and national integration, strengthen democracy, accelerate the process of modernization and cultivate social, moral and spiritual values.⁶

Indian leaders and educators themselves have asked the educational institutions to concern themselves with values and attitudes, to promote equality and social justice, to help solve social problems, to aid in increasing productivity and economic development, and to extend their many services to the community at large. Universities, according to them, "must learn to strive to serve as the 'conscience of the nation' and become a forum for a critical assessment of society"⁷.

Apart from the modernization and equalization functions, education has an alleviative function. Educational institutions have an added function during a social crisis. Poverty being a national problem, they do set up ad hoc deployments to alleviate it. No sooner does a poverty problem arises in the public consciousness than the schools will be assigned an extra

⁴Samuel Bowles, *et al.*, op. cit.

⁵Ribich Thomas, *Education and Poverty*, The Brookings Institution, Wash. D.C., 1968.

⁶Ministry of Education, *Report of the Education Commission, 1964-1966*, 613.

⁷*Ibid.*, 275.

responsibility of reorganizing its facilities to face it effectively. In this respect, a noted sociologist remarks :

When new functions are conceived out of a shift in the value structure of a culture, some institutions are defined as reasonable recipients of new responsibility. Education has cooperated with social demands to incorporate into its already overloaded structure devoted to the problems of the society.⁸

Besides, in a country like India, laden with multiplicity of castes and creeds, customs and conventions, schools have been required by their cultural traditions to socialize all students, irrespective of their social origin, to the expectations of the larger society. The schools attempt to assimilate the poor by instilling in all a similar set of values. These values range from inter-personal behaviour to job commitments. Assimilation is also intended by way of providing an access for all strata to educational and occupational opportunities.

Once this basic poverty alleviative function, comprising economic, educational, social and political facets, is accepted, an educational model can be constructed based on available research evidence. Before picking up the building materials, one need to find out the available data on the issue.

EFFECTS OF POVERTY ON EDUCATIONAL SYSTEM : RESEARCH EVIDENCE

Poverty has been studied *per longum et latum* by various categories of schools and professions. Economists, sociologists and educators have done volumes of research from their own respective angles. Since the poverty-alleviative role of education is assumed, a brief account of the by-products of poverty on educational system is of strategic importance, if any concrete plans are to be chalked out and executed. Considerable research has been done in the following areas.

(i) Poverty and Culture

This area has been fairly well studied by cultural anthropologists. In India, however, this field is not fully cultivated, though the matter can be

⁸Carl Weinberg, *Education and Social Problems*, The Free Press, New York, 1971, xiv.

occasionally culled from handful of ethnologies. Studying family in this category is most critical. Too often families of low socio-economic status lack role models of successful students to emulate. With the result, there are specific differences between middle income and low income families that tend to effect differences in the school performance of children. Hunt (1961) in this connection, highlighted the fact that children of low socio-economic backgrounds generally have few intellectually stimulating experiences before entering school and that they do not have the advantage of the kind of "hidden curriculum" commonly present in middle class homes. Radin and Kamii (1965) have stressed another element to this area. They noticed that mothers in families of low income often do not foster the development of internal controls in their pre-school children. Instead, they try to protect their children from the dangers they see in the external world and to suppress the dangers. The different ways mothers of middle and poverty class train their children are brought out by two major studies of Hess and Shipman (1965) and Bee *et al.* (1969). Quite a comparable trend has emerged out of these studies. They found, first, that middle-class mothers are more attentive to the continuous flow of goal-oriented action. Second, they allow the child to set his own pace and make his own decision move. They intrude less often and less directly in the process of problem-solving itself. Fourth, they structure the search-task by questions that sharpen yet ease for means. Fifth, they are more oriented towards the overall structure of the task than responsive to competent acts in isolation. They react more to the child's successful efforts than his errors.

These studies show the significant role of mother in the child-rearing practices. Secondly, it is the mother at home who can do a lot for the upward mobility of her children.

(ii) *Poverty and Language*

Akin to the former area of research, this area is little developed in India. The development of a language which is culturally accepted and which is conducive to problem-solving is of paramount importance in any culture. Language helps in the analysis-synthesis process, 'decontextualization' process, etc. It is, above all, a medium of communication. Considerable amount of research has been done by Hess and Shipman (1965) who found comparable differences in mothers of middle and lower class families. They distinguished three separate modes of communication: cognitive-rational, imperative-normative and personal-subjective. They found the middle-class mothers having the highest concentration in the

However, care should be taken, warns Riessman⁹, to specify what the presumed defects are. It is not correct, he warns, to talk about language deficiency as a general handicap among the low-income children. It is more accurate to speak about deficiency in syntax and formal language. But in other aspects of language, such as the use of metaphor, rich adjectives, hip language, the connection between verbal and non-verbal communication, there is a positive strength.

(iii) *Poverty and School Performance*

This area has also been studied as socio-economic background and academic achievement. It is, in fact, oft-repeated variable in educational research. In India too, this aspect has been well studied. Achievement in school can be of two types. One is achievement at the cognitive level, the other is achievement at the moral level. This differentiation occurs in terms of the child's display of cognitive ability, on the one hand, and his ability to demonstrate behaviourally that he has internalized the moral expectations of his school world on the other. Because of these differentiations, there arise, Weiberg points out, certain dysfunctions. While climbing the prestige ladder, children of low socio-economic status developed competitive antagonisms towards those who hold superior position and towards those teachers who award the positions. This creates an atmosphere of social competition rather than learning. If the position comes to be valued more than learning, then deviant techniques, such as cheating, becomes functional and positively valued. Besides, students also begin to attempt to raise their status by diminishing the reputation of others. This is called a 'pulley strategy' by Weinberg, whereby one pulls himself up by pulling others down. Behaviourally, this can be observed by such acts as tattling, criticism of each other, stealing the homework of those who do it and later developing social sanctions against 'rate busters'.

In India, Mathur's study (1963) revealed that "the SES did contribute to the differences in the ratings about the conduct of students". Chopra (1964) found on 7 per cent of first classes among the lower socio-economic group. Besides being academically poor, Gaur (1977) found students from low income group were introverts, aggressive, depressed, with stealing habits and sex-perversions. Ahmad's study (1968) revealed that students from families of higher educational and occupational levels reflects a broader social outlook and pattern of behaviour and attitudes which can

⁹Frank Riessman, *Strategies against Poverty*, Random House, New York, 1969, 44.

be identified with 'modernization'. Datta (1970) too, came to the same conclusion that students from the highest income levels had, on the whole, markedly better examination results than poor students. A recent study by Usha Devi (1974) revealed that slum children who came from low family background had low academic achievement at all the grades. However, Barial (1966) showed that there existed no significant difference in the educational achievement of the students belonging to various classes. Results of research in this area, by and large, are conclusive about low achievement, cognitively or morally, of low income groups.

(iv) Poverty, Wastage and Stagnation

There is no diversity of opinion regarding the significance of the problem of wastage and stagnation in Indian schools. The wastage rate is so high that even the best efforts go futile. Children coming from low income groups do not stay long enough in a school to achieve cognitively, nor do they persevere to learn a trade or master skills. Their parents are uneducated or extremely poor, hence, they prefer extra hands which bring grist to the mill. Analysing the family dynamics of dropouts at the primary level, Tiwari (1970) found that mothers in such families were least educated, that parents were more frustrated and regressed, that they were more autocratic, and that children got more rejection and frustration. Chopra (1964) clearly showed that 96.09 per cent who discontinued education attested poor economic conditions of family. Sharma and Sapra (1969) found out that in Indian primary and middle schools, wastage was 65 per cent in Class V, and it rose to 78 per cent in Class VIII. About 50 per cent wastage was noticeable in Class I itself. Wastage and stagnation was more among girls than boys. Illness, mental retardation, economic backwardness, social maladjustments and home problems were some of the factors responsible for dropping out from the schools. Das (1970) too, found similar results. He found wastage and stagnation up to 76.27 per cent in the Sibsagar district. Poverty and economic backwardness obtained the first rank among the 40 causes that were found responsible for wastage at the primary level. The above factors show clearly how poverty is the main cause of wastage and stagnation in India.

(v) Poverty and Achievement Motivation

This is another field where considerable research has been done. The

problem here is whether students and parents of low income group aspire for better educational and job opportunities. However, the results from a few studies are inconclusive. Studies done by Chinoy (1955) and Manuel *et al.* (1960) revealed the occupational aspirations of low income group. The former found that parents of low income and unskilled group wished their sons to become doctors, lawyers, engineers or business executives. The latter found that children of mechanics or blacksmiths wanting to be engineers, children of clerks wanting to be officers revealing 'horizontal conservatism combined with vertical mobility'. McClellan's study (1961) was striking in the fact, that it gave real reason behind the upward aspirations. Creativity appeared to be a quality which was not an exclusive possession of the economic elite. The results indicated the fact that certain lower class students, regardless of academic performance, had somehow internalized motivational quality that pushed them toward mobility goals. Educational aspirations of the low income group were clearly evidenced in Lipset and Bendix's study (1962). They found that the eight-tenths of the parents wished their children to acquire a college degree. Only the one-tenth would be satisfied with a high diploma. Cohn's work (1966) showed that lower class orientations are toward business or professional obligations. Robinsons and Robinson's review (1968) showed that middle class children are more strongly motivated toward achievement than lower class children.

A realistic aspiration level, both educational and occupational, has been observed by Jayseelie (1974) in her study. She found that educationally 12.1 per cent of parents of slum children aspired their children to possess postgraduate degrees, 23.6 per cent aspired for college, diploma or technical qualifications, 58.5 per cent desired for matriculation and 5.7 per cent for below matriculation. Occupational aspirations were found to be the following: 10 per cent of such parents aspired their children to have medical, engineering and legal professions, 15.7 per cent wanted managerial service, 58.6 per cent of parents wanted their children to be factory workers or clerks and 15.7 per cent wished their children to be unskilled labourers. This change may be due to the facts that more and more poor people want immediate employment after minimum education and that they may feel that they are not cut out for such a high educational endeavour.

(vi) *Poverty and Teachers*

The role of teachers with regard to poor children needs little emphasis. Suffice it to say that teachers play a key role in understanding the improve-

rished children and sympathizing with them. Not only are they to be sympathetic towards them, but they need to understand the cognitive needs of low-income children. In a word, teachers in a school system, are mainly responsible for alleviation of poverty. But it is difficult for teachers to help poor children. They may be eager to assist the poor children, but the minimal requirements for this support and encouragement may be an expressed acceptance by the students of the core values and the formal requirements. It is like saying: "Show me you can stand and I will help you to walk". Many students of low income bracket cannot even stand, or walk in a way that is 'preferred'.

A few researches are available as to the techniques teachers can employ in the classroom with regard to low-income students. Clark (1965) believed that if teachers raise their standards for children of very low income status their performance would improve. Coleman and his associates (1966) found that mixing children from middle-income families with children from very low socio-economic group seemed to increase the school performance of the latter. Cloward (1967) noticed that using children from low socio-economic background to tutor young students of similar backgrounds improved the achievement of both groups.

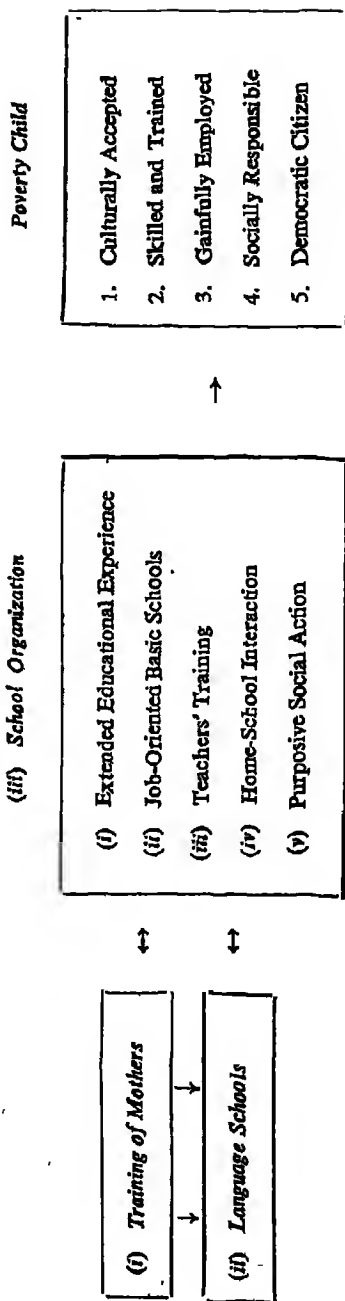
In the area of awareness, the present writer's study (1973) showed that teachers had better awareness of poverty in India. Cognitively, affectively and conatively, teachers ranked higher than their students. With a better awareness in all spheres, it only shows what teachers can do to inculcate an awareness of poverty in the classrooms:

FUTURE STRATEGIES

In the light of the above studies and the conditions prevailing in India, it remains now to be seen what strategies can be chalked out in the near future. Any involvement in the sphere of poverty by the educational machinery cannot be done single-handed. It must be a collective venture. Not only should the teachers and students be part and parcel of these alleviative programmes but the parents and community at large should take a responsible part in them. Education, in this regard, must be taken in a broader perspective. It has a responsibility not only to provide the knowledge and skills required to eliminate poverty but to bridge the gap between the family and the school, to show the way not only where the opportunities are but how to use them.

The following suggestions are by no means conclusive and comprehensive. They should be perfected and worked out to meet the needs of time and

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place. To get a comprehensive picture, the writer, in his limited way, presents the following model of strategies.

(i) Training of Mothers

The first strategy is to study the cultural transmission that takes place in poor families. True, cultural anthropologists have done some yeoman work, but not enough research has been done in India as to what types of child-rearing practices are related to specific types of behaviour. India is a cradle of many cultures and transmission process varies, covertly or overtly, from culture to culture. In this process, the role of mother is most crucial. With regard to poverty, "she is to be worked with not compensated for". They need be taught that problem-oriented education at home, with children on their laps, is the best type of education. Just as mothers need to know that small family brings about happiness, so too they need to know that being less autocratic and dictatorial, problem and achievement-oriented, they could give best form of training to their children. In addition, mothers of low income must be encouraged to let their children talk while taking meals, especially about school, give the children to play with, praise success; in short, to let the child know that the parent wants him to succeed in school and is interested in what he does. This has enormous impact on the children's verbal ability, for they begin talking about school when they get home, instead of remaining mute, and it has profound effect on increasing motivation.

Along with the training of mothers, it is equally important to provide warm, achievement-oriented parental figures of both sexes after whom appropriate role patterns can be established. Because poor children lack such parents, there could at least be a prototype of such parents either in the village, or among teacher or among national leaders.

(ii) Language Schools

The second area of suggestions deals with language problem. Torn as it is with linguistic minorities, language issue in India is all the more difficult to settle. To make matters worse, the language of low-income is a disadvantage to educational progress in more ways than one. First, the child has difficulty in receiving and communicating ideas. Second, lower-class language is a disadvantage because it types the child who employs it. Third, the language of the lower-class children is a disadvantage because

these children become alienated from the school culture which places heavy emphasis on 'standard' language. Fourth, the language of lower-class children becomes a burden to them in so far as they learn that, since their language is not acceptable, their attempts at communication would be negatively received.

The writer recommends opening of more language schools and laboratories for pre-primary children in India. Children of poverty class must be early admitted to these language schools. These nursery schools must begin admitting children of three and four years of age. "It is between the ages of three and six . . . that the battle is won or lost."¹⁰ Such nursery schools, it has been stated, will reverse the effects of a starved environment by providing the stimuli necessary for future learning and will teach the specific skills pre-requisite to learning how to read. Such schools, undoubtedly, should be staffed with language teachers trained in methods of teaching poor children. In such schools, Cynthia Deutsch argues, poor children will learn good manners and format of asking questions, of answering them, of asking permission, of taking tests, of finding information, of seeking proper recreational or tension-reducing outlets. In this way, they would be culturally on par with their counterparts of high-income group who will join them later on. In such language schools, the regional language could be first begun. Early admission in such schools is also advantageous in the sense that children then will be ready to discover that teachers expect what parents expect and will be ready to meet these expectations. Children will also learn that behaviours that were punished and rewarded at home will be punished and rewarded at school.

(iii) School Organization

(a) EXTENDED EDUCATIONAL EXPERIENCE : At the organizational level, the writer feels, that children of low-income group must be provided with extended educational experiences. Because poor children achieve slowly, and because of their lack of experiences, they tend to develop loyalties to a set of notions and attitudes that are alien to educational success. As a result, such children define culture as high brow, correct language as pretension and non-existing experiences as a bore. Weinberg, in this connection, suggests that drama, current events, newspapers, concerts, and films be made to them. Role-playing too, is a "marvellous stimulus for discussion and it

¹⁰ Charles Silberman, *Crisis in Black and White*, Random House, New York, 1964;

appeals to the deprived children's love of action."¹¹

(b) **JOB-ORIENTED BASIC SCHOOLS** : Secondly, at the organizational level, re-introduction of basic schools would be of immediate need in India. Unemployment being a major social problem in India and universities trying to produce 'paper' graduates, Gandhian concept of education, the writer urges, be given close attention and careful execution. Gandhi had a good intention to make the school curriculum more oriented to the life of the community and to inculcate elements of manual work needed for a successful living. Even the basic schools that in diluted form had been started have been mostly shunned by the upper-class families. A reincarnation of basic schools has appeared recently in the form of national social service, work-experience, etc. As they are limited by time and do not prove useful to individual since they do not teach a trade or skills, the writer feels that basic schools be started once again. This would also teach dignity of labour to students and lower down the sky-rocketing occupational aspirations of the poor children.

These basic schools must give vocationally oriented training in the form of manpower training programmes. It goes without saying that vocational training brings about more economic return than general training. This is so because in the case of vocational training for the poor children, there is not as much guess work involved in concentrating the educational effort on those who will likely have low incomes in the future. Many such children will do well as adults. The strategy is based on the idea to provide jobs first and diplomas later to the students of low-income family. This is directly at variance with the most popular concept in India, namely, that an individual has to complete long years of education after high school before being allowed to perform a meaningful job.

Depending upon the 'growth' occupations in India, attention should also be paid to such occupations as television serviceman, laboratory technician, data processing specialist, culinary worker, industrial draftsman, and so on. The writer also recommends the New Careers Model proposed by Riessman.¹² According to this model :

1. Entry level positions such as teacher aides, family planning aides, community aides, health aides, probations aides, counselling aides, research aides, recreation aides, child care aides, etc. can be given with minimum pre-job training.

¹¹Frank Riessman, 'The Culturally Deprived Child', Harper and Row, New York, 1962, p. 32.

¹²Frank Riessman, *Strategies against Poverty* Random House, New York, 1969, 22.

2. While on the job, these aides can acquire further training during a portion of a working day, and can also obtain higher education, including college courses, at the work sites in time released for advanced training.
3. This training should help the aide to move up a career ladder, where he can function on increasingly higher levels of skill and responsibility.
4. The job experience, on-the-job training and site-based education can be combined with evening and summer college courses so that he can acquire a college degree in a relatively short period of time.

These new careers are not easy to implement. Coordination of entry-level jobs, training and a visible career-ladder leading to higher positions must be provided. Nevertheless, an early attempt can be made in this line for the poor children.

(c) **TEACHERS' TRAINING** : Teachers in the school organization be properly trained and processed to suit the poor children. There are many eminent educators who feel that it would be enough if teachers could somehow implant a set of attitudes that are tactically effective in motivating the poor children to aspire to attain a foothold in the legitimate channels towards economic advantage. But tackling the poor children is much more complex and the Indian teachers are least trained in this field. There is a need for better and effective teacher training. In order to make them more aware of the behaviours of the poor children, they need to participate in workshops and inservice training given for this purpose. Besides, teachers themselves be selected carefully depending upon teaching experience, history of commitment and involvement in national social problems. Training may also involve a number of techniques, from controlled experiments in which previously rewarded attitudes are criticized or not accepted, to basic encounter type sessions in which teachers are forced to re-examine their value systems. Teachers themselves must be made to feel that their responsibility is paramount and that they should refrain from commenting on the life-circumstances of poor parents.

Within the classroom teachers must employ the techniques evidenced by research. Added to this, their method of teaching low-income students need further study. They should follow the steps, the writer feels, forwarded by Ansubel (1963). With regard to poverty group, he feels, (a) the selection of initial learning material should be geared to learner's existing state of readiness, (b) mastery and consolidation of all on-going learning tasks must be made before new ones are introduced so as to provide the necessary foundation for successful sequential learning, and to prevent

unreadiness for future learning tasks, and (c) the use of structured learning materials should be optimally organized to facilitate efficient sequential learning.

Indian teachers could do well if they could meet the parents of low socio-economic group. True, they have little time to do so due to their heavy schedule of work. Nevertheless, such visits would enable teachers to know the kind of environment the students live in. They would also give positive encouragement to parents and would make them aware of what they can do to reinforce and support the child's efforts to learn in the class.

(d) HOME-SCHOOL INTERACTION : The next strategy, the writer recommends, lies in the field of home-school interaction. Since family and school are the two socially recognized institutions to transmit culture, a strong identity of aims and execution of plans would be of immense value. Both are the agencies of upward mobility. The main attempt here is to involve the parents in the one goal of helping the child develop attitudes and aspirations which will motivate him to take advantage of educational opportunities. The second reason for seeking parental help is to compound the support or reinforcement of skills developed either at home or school. The third reason for such a connection is to assist children in accepting the worth and value of the teacher.

(e) PURPOSIVE SOCIAL ACTION : The most crucial strategy for the down-trodden children is to do purposive social action. The writer feels that this can remedy the psychological consequence of their powerlessness and of the image of the poor. Effective and purposive social action will re-define the poor and will remove the bottlenecks that come on their way of progress. The poor children being the majority in Indian schools, they can present a formidable 'life force', so as to threaten the status quo with disturbing alternatives for a meaningful poverty programme. The purpose, again, is to build potential pressure groups.

For such purposive social action, Alinsky¹³ provides a radical model. It is built largely through stirring conflict, "rubbing raw the sores of discontent" and attempting to disorganize whatever community organization exists for the rich and the powerful. A continuous state of militancy is emphasized, demonstrations, pickets, boycotts, direct action and publicity are stressed. A socio-therapeutic dimension is added to his model by Silberman¹⁴ and Haggstrom¹⁵, arguing that militant social action presumably transforms

¹³Saul Alinsky, 'From Citizen Apathy to Participation', paper presented at the Association of Community Councils of Chicago, October, 1957, 4 and 6.

¹⁴Charles Silberman, op. cit., ch. 10.

¹⁵Warren C. Haggstrom, "The Power of the Poor", *Mental Health of the Poor*, (Eds.) Riessman, Cohen, Pearl; New York, Free Press, 1964, 205-212.

apathetic, dependent, poor people into independent, dignified citizens. Haggstrom believes that poor people need power, not money, and that this power will make them feel able and competent.

The poor children, participating in useful social action, reminds Coles¹⁸, "are better integrated psychologically as well as racially. They act out of deep moral convictions and in a spirit of sensitivity and thoughtfulness... They are committed to action, dedicated to affirming new values .." This action, the writer feels, must be geared round the very roots of poverty and its perpetuation in India. Activities based on socially useful projects would be useful. Social activities, in and outside the classroom, at the cognitive, affective or conative levels, can bear one or more of the following elements :

1. That uncontrolled population growth means starvation for the poor of India.
2. That life-long education, to improve one's skills or to learn new ones, is the only legitimate channel for the upward mobility for the poor.
3. That the tendency toward idleness and inefficiency coupled with an attitude of economic horizons, survival-mindedness, self-sufficiency, careful deposition and preference for a leisurely life are by no means advantageous for the removal of Indian poverty.
4. That in a 'soft-state' like India, egalitarian laws meant for ameliorating conditions of the poor, are to be implemented by all, rich and the poor.
5. That poverty in India cannot be removed until corruption with its harmful lubricant smelt in public offices, is abolished.

Any social action by the poor children is not intended to distract them from their studies nor prevent them from learning marketable skills, but to make them aware of how they can alleviate poverty in India by building strong power structure.

CONCLUSION

With the above suggestions, by no means all-embracing, it is hoped that the poor children would, first of all, be accepted in a culture. They will make up for their cultural loss and language difficulties in the language schools, wherein they will learn culturally accepted behaviour. Language

¹⁸Robert Coles, "Children and Racial Demonstration", *Children and Poverty*, (Ed.) Glazer Y. Nona and Creedon F. Carol, Rand McNally & Co., Chicago, 214-215.

schools can compensate adequately for the cultural loss. By learning socially useful skills in basic schools, the poor children later on can be gainfully employed or employed first, and trained later. By participating actively in social action, children will learn how to build power structure and thus would be able to alleviate their own plight eventually.

The present paper has briefly outlined how education, in spite of being slow and inefficient, poverty reduction option is the only legitimate channel that can break the age-old poverty cycle in India. The schools, in this connection, have multiple roles to play. A model was established, based on research evidence and available literature, on how to make the educational machinery work for poverty alleviation in India. If poverty was accepted as a global concept, a massive attempt on all factors are required for poverty reduction. The cost of such an all-round programme, it is feared, would be enormous but not so great as the cost of doing without it. Poverty, in spite of all this, may still be universal in India, but let us hope, it may not be perennial.

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Influence of Non-Intellectual Factors on Different Ability Levels

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This study was designed to explore the relationships between certain non-intellectual factors and academic performance at different levels of ability. The sample was 250 students from higher and lower ability groups of a large comprehensive school in England. Results showed that the pattern of predictor variables in two groups were somewhat different. The analysis seemed to suggest that academic achievement at higher levels is a better predictor than at lower levels of ability, and that a different combination of factors tend to influence academic performance at different ability levels.

EARLY research on predictors of academic attainment focussed primarily on intellectual and ability factors. In recent years there have been important shifts in emphasis, due primarily to the recognition that some students attain higher standards and some lower standards than predicted by intelligence tests. This recurrent theme involving the attempt to unravel the complex determinants of academic attainment is often found in educational research. Subsequently, a wide variety of research reports have drawn attention to the importance of non-intellectual factors. There is considerable evidence, however, that intelligence alone does not account for all of the variance in academic achievement (Lavin, 1967; Cattell and Butcher, 1968; Vernon, 1950), although this is perhaps still the single most effective predictor of school achievement. Research has shown that early experiences of the child in the home, social factors and environment, all affect both the development of intelligence and the level of achievement. Variations in relationships among students taking different academic disciplines are also reported in a recent study by Wilson (1971). Any attempts, however, to understand the complete causal chain associated with academic achievement must include the effect of personality, attitude and motivation in determining learning of and performance both at school and college levels. Many previous studies of non-intellectual factors usually assumed a linear relationship between some predictor variables and academic performance. Failure to analyse academic performance within different ability levels might mask the operation of predictors and the researcher may get a distorted picture. The present study, therefore, was designed to cast a wide net of non-intellectual factors to examine whether these factors related to academic performance at higher levels of ability operate differently from those resulting in success (or failure) at lower levels of ability. The typical English comprehensive school affords an opportunity to see whether, when the school variable is held constant, the same or a different combination of factors tend to affect school attainment at different levels of ability.

The Labour Government's promise in 1965 to establish comprehensive secondary education in place of the selective system developed since the 1944 Education Act has passed through different phases. Its final introduction has led to a radical change in the whole structure of English secondary education. In spite of sincere efforts on the part of the Labour Government, there are still many authorities who have not adopted the comprehensive system. Benn and Simon (1970) estimated that if a pure definition of comprehensive schools was used, applying only to those in areas where all selection at 11-plus and throughout the secondary stage had been abolished, the percentage of secondary school population in 1970 at comprehensive school would not be more than 10 per cent. However, reorganization of secondary education in Britain along comprehensive lines

is a selective to an all-inclusive system. Two publications (Monks, 1971; Benn and Simon, 1970) look at some of the many aspects of comprehensive education, but do so from a descriptive viewpoint only—no direct attempt was made to explore the psychological factors in a system which is based on the principle of receiving students of all types under one roof. This study examines some other aspects of the comprehensive system as well (Verma, 1972).

THE PRESENT INVESTIGATION

Subjects

The sample consisted of 250 students, aged 14 to 15, who were drawn from a large comprehensive school in the south of England. Of these students, 130 were in the higher and 120 in the lower ability groups. The ability grouping was based on the 11-plus¹ selection results in IQ, English and arithmetic tests. Neither sex nor race was a criterion for student selection or for grouping.

Measures²

The choice of non-intellectual factors was made carefully to include personality, motivational and attitudinal factors in addition to school achievement. The development of new tests always carries the risk of personal bias unless they are repeatedly validated. Hence the repetition, extension and interlocking of past and new instruments were considered more appropriate. The instruments employed were as follows :

THE JUNIOR-SENIOR HIGH SCHOOL PERSONALITY QUESTIONNAIRE (HSPOQ) (Cattle & Beloff, 1968)

This multi-dimensional personality questionnaire covered 14 primary factors : cyclothymia, intelligence, emotional stability, excitability, dominance, surgency, conscientiousness, venturesome, tender-minded, individualism, guilt-proneness, self-sufficiency, will-power and tension.

¹This refers to the selection examination (Junior School Leaving Examination at the 11-plus) for admission to different kinds of secondary school. Intelligence scores were obtained from the Moray House Verbal Reasoning Test of Intelligence, and English and arithmetic achievement scores from standardized tests. Most of the local education authorities in Britain have now abolished the 11-plus selection examination.

²More detailed information about any of the tests may be obtained from the authors.

THE SITUATION TEST (Adapted from Rudd, 1956)

This test attempted to measure eight traits of personality : sociability, confidence, cooperation, interest, determination, anxiety, resentment and aggressiveness. The test consisted of standard school situation picture-slides, depicting different aspects of school life which were shown to the testees by means of a projected filmstrip. Each picture showed two students reacting differently when confronted with the same situation. The subjects had to choose the answer from the graded responses. The purpose of using this kind of semi-projective instrument was to encourage the students to project themselves in standard, but familiar, school situations, and to use this projection as a basis for self-assessment.

Teachers' Ratings

Two teachers who knew the sample under investigation well were asked to rate them on five traits of personality : emotional stability, persistence, sociability, maturity, and leadership and assertion. All ratings were obtained on a five-point Likert scale, with the format : "Compared with most students of his/her age, could be described as..." Possible answers were as follows : (5) extremely sociable; (4) very sociable; (3) sociable (average); (2) very unsociable; (1) extremely unsociable. Two criteria were adopted in the selection of the five traits : the relevance of the traits, and the possibility of defining and rating them consistently.

ATTITUDE TOWARDS AUTHORITY SCALE (Verma, 1973 a)

This 31-item scale was constructed by Likert techniques and validated on a fairly large sample of the British adolescent population. It attempted to measure the attitudes of adolescents towards school authority and included their attitudes towards school life in general. The psychometric characteristics are described elsewhere (Verma, 1973 a).

ACADEMIC MOTIVATION (Currie, 1962)

Likert's techniques were closely followed in the construction of this attitude scale. Its purpose was to measure the general attitude of pupils to schooling and included their attitudes towards work, success and failure, school-work, and their general determination to succeed in school.

ATTITUDE TO THE VALUE OF CONTINUED EDUCATION (Adapted from Miller, 1961)

Three stories were employed to obtain information with regard to the students' desire either to leave school or to continue with schooling. Since the test adopted the projective techniques, scoring was carried out independently by three psychologists, and the final score for each story was decided on the weight of evidence. The total score for each student was obtained by summing the weights assigned to the three stories.

INFLUENCE OF NON-INTELLECTUAL FACTORS

ORDER OF PREFERENCE FOR SCHOOL SUBJECTS

A list of 21 school subjects was presented to the students who were asked to place those that they had studied in the school in order of preference. The school subjects were then grouped into five categories, and arbitrary weights from five to one were assigned to the categories, with five for the most liked category.

MEASURE OF ACHIEVEMENT MOTIVATION

An attempt was made to measure the two distinct aspects of achievement motivation, hope of success (HS) and fear of failure (FF). These were assessed by responses to four TAT pictures. Each story was rated independently by three psychologists for HS and FF. For each student the two final scores were obtained by totalling the scores that were assigned to four stories by three judges. Evidence of validity of this measure has been published elsewhere (Verma, 1973 b).

THE SEMANTIC DIFFERENTIAL TEST (Zahran, 1966)

Following Osgood's techniques, a test containing 10 concepts and 12 scales was included in the battery. The concepts were : myself now; my father; my school; social activities; my mother; teachers; myself in 10 years' time; girls; my family life; my future job.

ELEVEN-PLUS EXAMINATION RESULTS^a

The results of the entry examinations (briefly mentioned earlier) taken by these age-groups as part of their selection procedures to secondary education were obtained from the school.

Social Class

The father's occupation was used as an index to classify the experimental population into different social classes. A modified version of the Registrar General Scale (1974) was adopted. The categories were : Class I—professional and managerial; Class II—clerical; Class III—skilled, divided into non-manual and manual; Class IV—partly skilled, and Class V—unskilled. For the purposes of analysis the different social groups were scored on a five-point scale, with a score of five assigned to professional and managerial occupations.

SCHOOL EXAMINATION MARKS (Criterion of Academic Attainment)

In order to obtain evidence on academic achievement, marks for the last annual examination in English, mathematics and social studies were utilized since the set of marks in English was found to be normally distributed.

^a Now this school holds its own internal examination for assigning students into different groups.

The marks in English were considered as the standard against which the marks in other subjects were scaled.

RESULTS AND DISCUSSION

To examine the relationship between the non-intellectual factors and academic performance of higher and lower ability groups, data were subjected to correlation and principal component analyses. A number of significant correlations between non-intellectual factors and academic variables emerged. The two matrices of correlations (higher and lower groups) were factor-analysed by the method of principal components. Six factors were extracted and rotated on the varimax criterion. The percentage of variance for the six factors for the two groups is given below.

FACTORS

	1	2	3	4	5	6
Higher ability group percentage of variance	12.77	8.38	7.37	6.97	5.91	4.88
Lower ability group percentage of variance	9.39	5.93	6.12	6.81	5.14	4.15

Inspection⁴ of rotated factor loadings indicated that Factor 1 in the higher ability group had high positive loadings on attitude towards authority, conscientiousness, school, teacher, tender-mindedness, will-power, emotional stability, and hope of success. The broad description is that of an academically motivated, conscientious student who possesses favourable attitude to school, lessons and teachers. The three negative loadings on dominance, surgency and liking for sports suggest a retiring bookish student.

Factor 2 in the lower ability group had positive loadings on teachers, school, attitude towards authority, liking for English. This factor may be summed up as a favourable attitude to school, lessons and teachers, like Factor 1 in the higher ability group. However, the personality pattern was characterized by social activities and surgency. Also in this group, school evaluation was associated with the 11-plus and IQ.

Factor 2 in the higher ability group presented the picture of a student who evaluates his prospects and his family highly. It had high loadings on

⁴In order to save space these tables have been omitted.

future, job, mother, family life, self, self in 10 years' time, social activities and cyclothymia. It is interesting to note that Factor 1 in the lower group presented a very similar picture. An outstanding difference between the two groups was that the self-concept factor loaded the 11-plus attainment results in the lower, but not in the higher group.

Factor 3 was mainly defined by Cattell's personality factors in both the groups. The overall loading pattern in the higher group indicated the tendency for liking for sports to be related to the dimensions of excitability, guilt-proneness and tension. In the lower group this factor was labelled 'conscientiousness v. excitability'.

A comparison of Factor 4 in the higher and Factor 6 in the lower ability group indicated that in both groups, achievement variables were positively loaded. However, in the lower group it was more centred on examination success and in the higher group it was labelled 'achievement'. Factor 6 in the higher ability group was largely intellectual-attainment type. An examination of the variables with high loadings clearly suggested that 11-plus selection was perhaps a fairly good predictor in this group.

Factor 5 of the higher ability group and Factor 4 of the lower ability group were primarily determined by teachers' ratings. The loadings indicated that in the higher ability group students whose personalities impressed their teachers favourably did well in mathematics and social studies, and were below average in sports interest. On the other hand, in the lower ability group teachers took less account of academic performance.

Factor 5 in the lower ability group did not present any clear-cut psychological picture. However, this seemed perhaps to define anti-school and anti-authority with low achievement motivation. But Factor 6 in the high group was largely intellectual and not noticeably related to personality characteristics. It seemed logical to designate this factor 'as intelligence-attainment'. The loadings indicated that the 11-plus selection examination was a fairly good predictor in this group, but no such cluster of ability measures occurred in the lower ability group.

Multiple Correlations

The multiple correlation coefficients were calculated between some of the independent variables and school attainment, for each of the two groups. Only those independent variables were selected which had high factor loadings. The obtained multiple correlations were 0.871 for the higher and 0.639 for the lower ability groups. The two matrices were successively reduced until every variable obtained a regression coefficient

with an F-ratio exceeding 1.0. Eight variables in the higher and seven in the lower ability group met this condition. The beta (β) coefficients were calculated for these variables. For the higher ability group, it was possible to account for 62 per cent of the variance in the school attainment criterion from the measured variables and the remaining 38 per cent was attributable to other factors. In the lower ability group only 33 per cent of the variance in school attainment was accounted for by the predictor variables, and 67 per cent was not accounted for.

The obtained beta coefficients showed that at the higher level of ability factors contributing positively to academic achievement were different from the factors contributing at the lower level of ability.

CONCLUSIONS

The results of this study regarding the influence of certain non-intellectual factors on scholastic achievement at different ability levels showed that the patterns of predictors correlating highly with achievement were different. The loading pattern in the higher ability group demonstrated the tendency for the five traits in teachers' ratings to be associated with two achievement variables—mathematics and social studies. It seems reasonable to say that in most cases high ratings on these traits are assigned to higher achieving students, not necessarily because they possess them, but because teachers consider them to be important for success.

The obtained results also indicated that in the higher ability group school progress was associated with success at the selection examination, which was confirmed by factor analysis. This finding is consistent with many previous studies which supported that past performance can be a good predictor of future achievement in students of higher scholastic ability (Goodstein and Heilburn, 1962; Holland and Nicholas, 1964). The picture at the lower level of ability was different, since most of the 11-plus selection variables gave no worthwhile predictions.

The combined picture of multiple correlational analysis and the factorial analysis showed that school achievement at the higher level of ability may be predicted with more confidence than at lower levels of ability. It further indicated that a different combination of factors tended to influence academic performance of the two groups.

At the present time we have perhaps a fairly good conception, both from research and practice, of the large number of determiners of scholastic achievement. It is hoped that the present research endeavour has thrown some light on the nature of the determiners of academic success which is seen to be a dynamic function of many intellectual as well as non-intellectual

tual dimensions, most of which have no relevance to inborn mental capacity.

Despite the conclusions drawn from this study it is dangerous to assume wide generality in statements about the relationships between non-intellectual factors and academic attainment. Age, sex, geographical area, classroom organization, class-size, teaching methods and teacher personality may all affect these relationships to some extent. A number of studies have observed differing relationships among urban and rural pupils.

Finally, it should be mentioned that because of the small size of research sample and the experimental nature of many of the instruments used, the design should be replicated in other kinds of schools, classrooms, etc. and it may only be in this way that the obtained relationships between non-intellectual factors and academic attainment can be fully explained.

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Evolverment of an Instructional Strategy for Teaching Educational Evaluation

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INSTRUCTION is an organized system of activities which works towards the realization of certain specific goals. The system here would involve different components which, although, distinct in their nature and operation, would function in a coordinated manner contributing to the achievement of the common goals. In an instructional situation the components would be the input learning material and various techniques and media of presentation, such as lecture, discussion, programmed learning, seminar, practical work, library work, radio, TV, tape-recorder, film projectors, etc. An instructional strategy is an organization of suitable components with their functions specified in relation to the specific goals to be achieved. These components as in any 'system' would appear in the final form of an instructional strategy in an integrated fashion.

The evolution of an instructional strategy would, therefore, have to be carried out in different phases. First phase consists of analysing and identifying specific objectives to be realized through the instructional strategy. In the second phase, suitable learning material for achieving the pre-specified objectives are to be prepared. The third phase relates to the empirical validation of the individual components of the strategy. The fourth phase would involve integrating the different components to form the instructional strategy and studying its effectiveness and efficiency in

realizing the pre-specified objectives. An instructional strategy developed through these phases would have two characteristics : (a) It would have specificity with regard to the goals which are to be realized through the individual components, and (b) the different components of the strategy would be so empirically tested and integrated to contribute towards common goals that the strategy would have the characteristic of reproducibility in similar conditions.

The present paper attempts to describe the developmental process followed in evolving an instructional strategy for teaching educational evaluation to B.Ed. students of the M.S. University of Baroda. Educational evaluation is included as a compulsory course in B.Ed. programme at the M.S. University of Baroda. Instruction in the course is provided for one full semester. The course has two broad objectives, viz., (i) imparting basic knowledge about educational evaluation under the heads : educational evaluation and measurement, characteristics of a good instrument of evaluation, major tools of evaluation and their uses, teacher-made achievement tests, and elementary statistics in education ; (ii) developing certain skills of evaluation, e.g. stating objectives in behavioural terms, preparing blueprints for tests, developing unit tests, etc. The evaluation scheme consists of periodical tests during the semester, and a comprehensive test at the end.

On a logical consideration of the broad objectives of the course, an appropriate instructional strategy may be conceived to involve the use of techniques of programmed learning, discussion, library work and practical work in proper combination. Basic knowledge related to different concept in the course would be given through programmed learning material (PLM). Knowledge through the PLM would be augmented by organizing library work. Practical work would be organized to develop various skills needed by a teacher to carry out educational evaluation in a school. The purpose of discussion would be to provide a forum for exchange of ideas, and to seek clarifications of concepts covered. It may be noted that the instructional strategy suggested seeks to utilize human media for presentation of software material. The use of any hardware equipment for this purpose has been deliberately avoided. Main consideration for such a decision has been the feasibility aspect of the strategy. As such the university has an adequate faculty to organize the programme of instruction for the course. The purpose of developing an alternative instructional strategy is to increase the effectiveness and efficiency of the instructional work, and not to replace the teacher. Further, utilization of hardware does not seem to be economically viable also, considering the availability of resources. Apart from feasibility aspect, the authors have presumed that non-

utilization of hardware media in this instructional strategy may not seriously jeopardise the efficiency and effectiveness of instructional work.

PHASE I

An analysis of the course-content prescribed and the broad objectives specified was carried out. Based on this analysis, the course was divided into six instructional units. For each unit, specific objectives were stated in behavioural terms. Flow charts were prepared for these units to determine proper sequence of presenting different content points.

PHASE II

This phase relates to the development of the PLM which forms the major software components of the strategy. The PLM was developed following the usual steps prescribed for preparing a valid programme. The programme has been developed in the linear form, although it is not a linear programme of the traditional Skinnerian type. For instance, the frames are not always very small; the frames, many a time, include open questions; the correct answers are frequently followed by further explanation before going to the next frame. No special entering behaviour has been pre-supposed on the part of the learners in respect of the content as the entrants to the B.Ed. course are graduates from various streams. All that is presumed is the basic ability to read and understand simple English, and the skills of performing fundamental operations of arithmetic involving decimals.

The first draft of the PLM was edited by an expert from the point of view of the content, language as well as programming principles. Along with the PLM the criterion test prepared for each unit was also scrutinized by the expert.

The edited PLM was, then, tried out on a group of 10 B.Ed. students. It was made clear to these students beforehand that for the particular course they should read only the PLM and not any other text. At the end of each unit the corresponding criterion test was administered. Performance on these criterion tests constituted the periodical assessment for these students. Difficulties encountered by the students regarding the language, frame-sequence and the like were noted. The six units of the course were covered in all full semester. Errors committed by the students on the programme frames and on the criterion tests were analysed. Based on

these error analyses and on the suggestions offered by the students regarding the language, frame-sequence, etc. the programme was revised for being used under Phase III.

PHASE III

This phase relates to the validation of the PLM and studying its feasibility aspect as regular instructional material. The nature, extent and sequencing of other components of the strategy, viz. discussion, library work and practical work are to be determined based on the results of the validation study. Validation experiment here involves the comparison of results of learning through the PLM and the lecture method. However, the purpose of comparison is not to establish the superiority or otherwise of any of these methods. It is only to see whether the PLM developed can produce learning effects comparable to those produced by the lecture method which is the method of instruction adopted.

Total sample for the validation experiment consisted of 69 B.Ed. students of the M.S. University of Baroda. The sample was divided into two groups matched on the basis of academic qualifications and teaching experience. The experimental group had 35 students and the control group had 34 students. Experimental group students learnt through the PLM. The control group was taught through lecture method. But proper controls were introduced so that there would be no discrepancy in the content input, and the total instructional time for the two groups.

Students in the experimental group studied the PLM for each unit in scheduled class hours for the estimated length of time. The average time required for completing each unit was estimated based on tryout study. A few students who could not complete the unit within prescribed time were allowed to study the remaining part at home. After each unit was completed, students were given the PLM for that unit. Students were administered the corresponding criterion test at the end of each unit. Feedback sessions were organized to discuss the performance of students on each test.

Elements of structuring and interaction were introduced in the lecture method adopted for teaching students in the control group. Structuring was done by providing the teacher as well as the students with booklets containing the course-content organized in the sequence in which the teacher would deal with it while lecturing. Six booklets were prepared to cover the six units of the course. These booklets and the six units of the PLM were developed based on common task analysis of the course. It was explained to the students that the booklets were not to be taken to replace

teacher's lectures in the class, but they were meant only to help them recall in an organized manner what was delivered through the lectures. A booklet for each unit was given to the students after it was taught in the class. Although the content to be delivered through the lecture was pre-planned and put in the booklet, the course of the lecture was made flexible enough to provide for intermittent interaction. At the end of each unit, the criterion test for that unit was administered which was the same as the one administered to the experimental group. Feedback sessions were organized to discuss the performance to students on each test.

Table 1
MEAN ACHIEVEMENT SCORES ON CRITERION TESTS

<i>Group</i>		<i>M</i>		<i>t-value</i>	<i>Significance</i>
Unit I	Experimental (N=34)	17.4	5.79	1.64	Not significant
	Control (N=34)	14.85	6.84		
Unit II	Experimental (N=35)	23.51	3.24	3.63	Significant at .01 level
	Control (N=34)	19.59	5.93		
Unit III	Experimental (N=35)	29.37	3.25	2.74	Significant at .01 level
	Control (N=34)	25.97	6.36		
Unit IV	Experimental (N=35)	21.46	4.33	0.39	Not significant
	Control (N=34)	21.00	5.13		
Unit V	Experimental (N=35)	17.49	3.24	0.21	Not significant
	Control (N=34)	17.68	4.17		
Unit VI	Experimental (N=34)	12.94	3.73	0.61	Not significant
	Control (N=33)	12.39	3.57		

Effectiveness of the PLM was studied unitwise by comparing the criterion test scores of the two groups. Mean differences were tested for significance by using students' t-test. The results obtained are presented in Table 1. For studying the effectiveness of the PLM as a whole, two indices, viz. mean performance on the comprehensive test, and the mean of combined scores representing the performance on the six criterion tests were obtained. Comparisons were made after adjusting these mean scores by analysing of covariance for intelligence of the subjects measured using Raven's Standard Progressive Matrices. The adjusted means for the two groups are presented in Table 2. Differences in the adjusted means were tested for significance using the t-test.

Table 2
MEAN ACHIEVEMENT SCORES ADJUSTED FOR INTELLIGENCE

	Group	Mean	S.D.	t-value
Comprehensive test scores	Experimental (N=34)	62.64	9.93	0.168
	Control (N=34)	63.42	10.37	
Combined criterion test scores	Experimental (N=34)	73.99	10.09	1.901
	Control (N=34)	68.28	12.23	

It may be observed that neither of the differences is significant showing that achievement through the PLM and through the lecture does not differ. These results indicate that the PLM as instructional material for B. Ed. students is as effective as the lecture method adopted for the control group suggesting that the PLM may be utilized in the regular instructional work of the Faculty for providing instructions to B. Ed. students in the course on educational evaluation. It should be noted that the lecture method adopted for providing instructions to the control group is not just the same as the method in which the instruction is provided in the usual course. The lectures, here, are highly structured which, in fact, ensures that all the necessary content points are delivered, with proper emphasis, by the lecturer. The course of each lecture, that is, the sequencing of material is

pre-specified on the basis of scientific task analysis of the course-content and the objectives. Enough provision is made for interaction among students and the lecturer. The booklets provided to the students serve as guides for their reference and help them remember what they have learnt, in an organized way. Contrary to these procedures, in lectures given in the usual course decisions regarding specific emphasis to be laid on different content points, sequencing of instructional points, time to be devoted for teaching different points, etc. are left to the vagaries of the individual lecturer. It may not be too wrong to assume, here, that a well planned and structured lecture of the type adopted in the experiment is not the method usually adopted by the lecturers; and also that this method would be more effective than that of the usually adopted unstructured lectures. (This further strengthens the conclusion that the PLM whose effectiveness was found to be comparable to the structured lectures adopted in the experiment is effective enough to be adopted as instructional material for the particular course.)

Error analysis of students' performance on criterion tests was carried out. On the basis of this analysis and in consultation with the Faculty members involved, decisions were taken regarding the details of other components of the instructional strategy. It was considered that the deficits in learning indicated by performance on criterion tests could be made up by enriching the instructional process with the use of techniques of discussion, practical work and the library work. Sequencing of these different components was decided in consultation with the concerned Faculty members. The first step in the sequence of instructional work for each unit would be that students read the PLM; the students would then do the library work based on references provided to them. The third step would be that the students do the practical work under the supervision of the teacher, this would be followed by a discussion session.

PHASE IV

This phase relates to the integration of the four components, viz. PLM, discussion, library work and practical work to form the instructional strategy and studying its effectiveness for providing instruction. Effectiveness of the strategy would be measured in terms of students' performance on tests. Procedural details about the organization of instructional work for studying the effectiveness are given below.

The B. Ed. class which consisted of 168 students was divided into three groups for the purpose of providing instruction in this course. Three Faculty

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members were made in-charge for the three groups. An orientation was given to the students in the beginning of the session regarding the procedure of studying the course. Instructional work in relation to different components were carried out as under.

Programmed Learning

Students read the PLM during regular class hours. The concerned Faculty member remained present during these hours. If some students could not complete the unit within specified class hours, they did so outside class hours. The PLM for each unit was given to students in the beginning of the particular unit, and it remained with them for their reference.

Library Work

Books for reference with necessary details were given to students for each unit. They were instructed to refer these books after they had read PLM for that unit and before they came for the discussion period. Library work was done independently by students at their convenience. Students were suggested to maintain records of their library work.

Practical Work

Practical work sessions were organized for each unit. Details of the work to be carried out in these sessions were decided in consideration to the specific objectives of the units, and in consultation with the Faculty members involved in the instructional work. These details were made available to the members in charge. Practical work was done under the direct guidance and supervision of the member in charge. One or two class hours were devoted to each unit for this purpose.

Discussion Session

A discussion session for each unit was organized after the completion of the practical work for that unit. Discussions were based on the contents of the respective units. Certain points for discussion were specified based on the analysis of students' performance on criterion tests conducted during the previous phase. In addition to the discussion around these points,

Table 3

MEAN, SD AND PERCENTILES ON VARIOUS TESTS

	Unit I	Unit II	Unit III	Unit IV	Unit V	Unit VI	Comprehensive
Mean	17.72	20.08	19.56	19.56	19.01	14.71	70.60
Standard Deviation	5.10	4.02	4.53	4.83	3.27	4.98	20.60
Percentiles ₁₀	9.35	14.17	12.71	11.00	13.48	6.86	40.20
P ₃₀	13.20	16.73	15.79	15.62	15.51	9.91	50.71
P ₄₀	14.70	18.68	17.93	17.50	17.12	12.32	58.44
P ₅₀	17.26	19.82	19.50	19.10	18.61	14.64	66.18
P ₆₀	18.57	20.96	20.86	20.38	19.60	16.42	74.32
P ₇₀	20.50	21.91	21.90	21.64	20.59	17.77	76.73
P ₈₀	21.52	22.69	22.65	22.71	21.58	18.45	86.05
P ₉₀	22.84	23.49	23.40	23.78	22.58	19.13	90.38
P ₉₅	23.91	24.26	24.15	25.00	23.57	19.82	95.43

*Maximum score for each unit test is 25 ; maximum score for comprehensive test is 100

Table 4

PERCENTILES ON COMPREHENSIVE TEST UNDER PHASES III AND IV

	P ₁₀	P ₃₀	P ₄₀	P ₅₀	P ₆₀	P ₇₀	P ₈₀	P ₉₀
Phase III (Experimental)	33.25	45.50	52.00	68.67	67.83	73.79	84.50	90.75
Phase IV	40.20	50.71	58.44	66.18	74.32	76.73	86.05	95.43

students were free to raise points for clarification. Discussions were guided by the Faculty members in charge.

Scheme of Evaluation

Evaluation included unit tests, feedback sessions, practical work assignments and a comprehensive test. A unit test was organized after discussion for that unit was completed—students' performance on the test was discussed in a feedback session after each unit test. In such sessions the teacher in-charge discussed and clarified the points which were not clear to students as indicated by their performance on unit tests. Work done in practical sessions was evaluated based on records of practical work submitted by students. At the end of the course a comprehensive test was organized.

Effectiveness of the instructional strategy was studied by computing the means, standard deviation, and percentiles on the six unit tests and the comprehensive test. The results are given in Table 3.

From Table 3, it may be observed that nearly 50 per cent of students have scored 75 per cent and above on the comprehensive test which is generally considered as performance with distinction. Only less than 10 per cent of students have scored 40 per cent and below; and 20 per cent of them have scored above 90 per cent. A closely similar trend can be noticed on each unit test. Under Phase III students in the experimental group learnt solely through the PLM; the other components of the strategy were completely absent. Therefore, a comparison of performance of the students on the comprehensive test in the Phase IV and that of students in the experimental group during Phase III should reveal the effectiveness of instructional strategy adopted in Phase IV. By observing the results presented in Tables 2 and 3, it becomes clear that there has been considerable difference in the mean performance of students in favour of the Phase IV group. Percentiles for the two groups presented in Table 4 give more detailed comparative picture of the students' performance on the comprehensive test.

The results presented in Table 4 further strengthen the conclusion drawn earlier regarding the effectiveness of the instructional strategy. It clearly indicates that the enrichment brought into the instructional work under Phase IV by including the components, library work, practical work and discussion, and integrating them with the use of the PLM has positively influenced the achievement of students.

CONCLUSION

Instructional strategy has been evolved through continuous experimentation over a period of two years. Motive behind this attempt has been to modernize instructional work with a view to increasing its effectiveness and efficiency. But this has been achieved with maximal utilization of available resources and with total exclusion of any hardware equipment which has made the strategy an economically viable one for implementation in colleges of education. Another important feature of the strategy relates to the conditions under which it has been evolved. When experiments are conducted in special extra-class situations they do not suggest any practical strategy for implementing the new approach. However, it might be observed that in the present case the experiment was conducted according to the regular schedules of the instructional work specified by the Faculty. This points to the administrative feasibility of utilizing the strategy for instructional purposes. □

Microteaching : An Innovation in Practice-teaching Programme

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INTRODUCTION

Training in Teaching

THE task of producing an effective teacher has generated a lot of research. For a long time this research centred round the teacher characteristics and their relation to pupil's learning outcomes. The results have been contradictory and inconclusive (Gage, 1963). Consequently, the relevance of many teacher-training programmes has often been questioned. One of the main criticisms is that student-teachers rarely spend time in actually studying teaching. There is no doubt that student-teachers improve during practice, but there is difficulty in specifying the improvement. A major break-through in the training of teachers has occurred with the recognition of teaching behaviour as a complex of skills that could be identified and practised systematically under specific conditions (McDonald and Allen, 1967). With the help of the technological devices it could be reproduced also. Skills and techniques are the basic prerequisites for putting into practice any teaching method. This implies that these basic

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skills could be practised by student-teachers before concentrating on the more complex matter of method for the specific subjects. Many of the student-teachers do not get the maximum benefit from their teaching practice because at the beginning they do not have the basic skills which could have been acquired earlier. This approach to training in teaching necessitates modification in the process of practice-teaching. The reason is not that the evaluation of the system of practice-teaching or the studies of the effects of practice-teaching have conclusively shown it to be ineffective but because more promising modes of teacher-training have now become possible.

Shortcomings of Practice-teaching

The main emphasis in the traditional practice-teaching programme is on the skill of communicating subject-matter information to the pupils. It has been our experience that after some theoretical information and a few demonstration lessons, student-teachers are sent to face real classes. Here they do not get the maximum benefit from their teaching practice. Palsane and Ghanchi (1967) surveyed the practice-teaching programme of 62 colleges. They observed that:

- (i) the number of lessons to be given by a student-teacher is fixed arbitrarily without taking into consideration the individual needs and abilities ;
- (ii) there is a lack of adequate orientation programme for initiating practice-teaching ;
- (iii) the student-teachers do not get practice in teaching continuous units and they have no scope for developing dynamism, initiative and resourcefulness as teachers ;
- (iv) the student-teachers lack opportunities for planning through cooperation with pupils, teachers and supervisors ;
- (v) there is absence of block teaching and an organized internship experience ;
- (vi) the assessment of student-teachers is not continuous and integrated which could carry further the seeds of progress, and
- (vii) the practice-teaching programme needs to be objectively studied and oriented in all the aspects.

The Education Commission (1964-66) also expressed its dissatisfaction in the following words :

The quality of training institutions remains with a few exceptions, either

mediocre, or poor, competent staff are not attracted, vitality and realism are lacking in the curriculum and the programme which continues to be largely traditional, and set patterns and rigid techniques are followed in practice-teaching with a disregard for present-day needs and objectives (pp. 67-68).

Again, although classroom observation has been there in our traditional training programmes for a long time now, efforts to develop objective and reliable scales of observation are of recent origin. Information which is given to the student-teacher through present traditional practice-teaching is not rich and clear enough to guide him toward self-directed improvement. Most observations are made as abstract generalizations that have little relation to the teacher's classroom behaviour. They are only opinions and stereotype value judgments. There is no provision to re-teach the same unit incorporating the modification suggested. Practising schools are not convinced of the efficacy of the practice-teaching programme and are reluctant to allow the student-teachers to practise therein. But the time is changing, yesterday's firm educational beliefs are fast becoming popular fallacies of today. When we concede so much of importance to the improvement of teaching, we can ill-afford to neglect at least experimenting innovations as T-group technique, simulated skill training, interaction analysis and microteaching, etc. in our practice-teaching programme. These innovations are relatively new and not yet well accepted. But these are taking place with some evidences to justify the change, although these evidences are tentative and not yet complete. Faced with incomplete knowledge as how best to help student-teachers to improve their teaching behaviour, it was considered worthwhile to evaluate traditional practice-teaching as well as the innovation of microteaching to find out whether they lead to any change in teaching performance.

Microteaching and Practice-teaching

Basically, microteaching involves the practice of specific classroom procedures in situations, limited in size, scope and duration. It is closely combined with relevant theoretical considerations such as the psychology of learning and immediate feedback to reinforce positive learning by student-teachers. Perhaps the Education Commission (1964-66) did have in mind the elements of microteaching when they recommended : "... He may begin his teaching practice with teaching individual children, then proceed to small groups and eventually learn to manage full classes having normal strength .." (p. 74). The Commission was right in suggesting

this procedure to be followed. At present after a few lectures on theory of teaching and a model lesson by the method master, the student-teacher is thrown into live classroom situation. While he gradually picks up some idea of how to teach, his prescribed lessons are over. From the start we expect the student-teacher to exhibit or practise all the skills of teaching, classroom interaction and management. Obviously, we expect too much. The results are vague and diffused understanding on the part of student-teachers and a low extent of improvement in their teaching effectiveness. The felt need of raising the effectiveness of practice-teaching is realized by all. An intelligent use of microteaching provides one method to those concerned with improving teacher preparation.

Microteaching is a relatively new departure in teacher-training. It was developed at Stanford University by Allen and his associates (Allen, 1966) and was used initially for the training of secondary school teachers. Five advantages (Allen and Clark, 1967) guided the plans for the training of teaching skills : (i) a realistic situation; (ii) minimum risk for both student-teachers and pupils; (iii) theoretical soundness, for example, numerous and distributed practice sessions, prompt feedback of results, immediate opportunity to make correction; (iv) provision of a wide range of experiences, and (v) economy in time and resources.

A typical microteaching sequence might be as follows: A specific teaching skill is identified, such as asking questions. The teacher creates a short lesson of about five to ten minutes in his area of specialization with a very specific purpose and teaches it to five to seven pupils, either real pupils or his fellow student-teachers. His lesson would be observed by the supervisor, who might also make a videotape-recording, keeping a careful note of the student-teacher's use of the particular skill. The student-teacher and supervisor immediately get together and review the lesson looking at the videotape, if one was made. A change to re-teach the lesson followed by another meeting is usually suggested. Thus the microteaching cycle is : Teach-View-Plan-Reteach-Review-Plan-Reteach.

The content of the lesson is selected in order to maximize the use of skill under review. The videotape gives the student-teacher direct feedback on his performance and the cycle gives him the opportunity of correcting his errors immediately after reviewing them and then to see his corrected performances. It is possible to point out two related areas where there are clear advantages. These are : (i) training in teaching skill, and (ii) its use as a research tool in teacher-training.

Literature Reviewed

The rationale underlying microteaching is still a mixture of research

and conjecture. Most of the research on microteaching is concerned primarily with its use as a technique. In his experiments, Allen (1966, 1967) confirmed the hypothesis that perceptual modelling and videotape demonstration of a skill were more effective than symbolic modelling or verbal description. The evidences of Kallenbach and Gall (1969) and Allen and Ryans (1969) demonstrate that microteaching is at least as effective as block teaching practice. The experimental group achieved a level of competence using small groups of children. Kallenbach reported that one-hour microteaching with five pupils is equivalent to five hours' teaching with 40 children. Experiments at Ulster (Brown, 1971) suggest that microteaching is worth considering by a college or a department experiencing difficulties in finding teaching-practice places and looking for ways of improving their training programmes and measuring their effectiveness. The feedback provided by discussion with a tutor and a group of observers was found extremely effective in an experiment on microteaching without the use of hardware development in the University of Malawi, Nairobi (Lawless, 1971). However, it was conceded that CCTV might add something to the discussions, but probably not sufficient to justify the cost and effort required to obtain and run it. In India Tewari (1967) led the project in microteaching at Allahabad. It was found that the scheme can be used profitably both in the teacher-training institutions and secondary schools. Some elements of individual teaching, if introduced in the scheme of teaching in practising schools, will display the student-teacher's insight and make them better qualified for the job. Chudasama (1971) tried out microteaching procedure in student-teaching. Both the control and the experimental groups were formed. As a result of training through microteaching, the student-teachers developed skills in questioning and ensured better pupil participation. Marker (1972) conducted a study which aimed at comparing the performance of student-teachers trained by microteaching and conventional approaches. The lessons were taken recorded and the feedback was given on the following day. Microteaching was found to be quite effective. Marker (1973) conducted another experiment on microteaching in simulated conditions. Results were again found to be encouraging. Singh (1973) compared the effectiveness of microteaching technique and Flanders' Interaction Analysis with traditional practice teaching. The results indicated that the student-teachers trained through microteaching changed their verbal behaviour in the classroom significantly better than those trained through traditional practice-teaching or Flanders' Interaction Analysis technique.

The Need

The early experiences with microteaching technique as discussed above

indicated that its use is feasible and the results are promising. Therefore, the study of this approach seems necessary to determine the potential contribution, it can make to teacher-education. It is not denying the fact that our traditional practice-teaching has impact on teacher training. It has its own way of feedback which lacks objectivity and urgency. It is also true that no through review of studies of the effects of practice-teaching on attitudes or on the skills of teaching has been done which could conclusively show it to be ineffective. But it is considered worthwhile to make an attempt to modify it since a more promising mode of teacher-training, that is microteaching, has now become possible. It is not an attempt to replace the traditional practice-teaching, but a serious endeavour to modify it to bring more objectivity and specificity in shaping the teaching behaviour of student-teachers. Faced with incomplete knowledge as how best to use microteaching under our condition, it is prudent to see its usability and the efficacy by evaluating traditional teaching programme as well as the innovation of microteaching. Buch (1967) studied innovative practices in teacher education. Joshi (1972)) undertook a systematic study of innovations in teacher-education programmes at Udaipur. These studies have brought to light the efforts to improve teacher education in the country. They also indicate the concern of teacher-educators to develop new practices to reshape teacher education.

EXPERIMENT

Objectives

The experiment was planned and conducted to fulfil the following two objectives :

- (i) To collect classroom behavioural data to show whether or not there is significant difference between the student-teachers, given the treatment of microteaching, and the control group student-teachers, using the traditional training method only.
- (ii) To see the usability of microteaching in the teacher-training programme.

Teaching behaviour in the classroom is defined as teacher verbal behaviour in the classroom based on Flanders' Interaction Analysis category system.

Design

A simple experimental pretest-post-test design with one experimental

group and one control group was executed. The study included 10 student-teachers in the control group and five student-teachers in the experimental group (out of 10 student-teachers five dropped through the experiment). The groups were matched on the variables of age, sex, marital status, area (rural or urban), socio-economic status, marks at graduate level, subjects at graduate level, teaching subjects and teaching experience. The treatment given to the experimental group was the microteaching in simulated condition as well as in real situation. This was in addition to the traditional training given to the experimental group and control group. All the student-teachers were observed by Flanders' Interaction Analysis category system. The experiment was conducted in Class VIII of the same school, in social studies teaching class through the medium of Hindi.

Sample

The sample of 20 student-teachers for the experiment was selected out of 157 student-teachers admitted in Tilakdhari College, Jaunpur, U.P., in the session 1971-72 for B.Ed. training. For the purpose of controlling the variables, only male student-teachers, who fell in the age-group of 20 to 24 years and who came from rural areas, were selected. Again, the selected student-teachers showed income range of their family earning between Rs. 4000-5000 per annum; they were married; they had passed their B.A. in the year 1971, secured 40 to 50 per cent marks and offered at least one language and one subject from social sciences at the graduate level examination. They had no previous teaching experience and had offered Hindi and social studies as their teaching subjects in B.Ed.

Tools and Treatment

For gathering information relating to the matching variables an information proforma was prepared and administered to the student-teachers under training. For training the student-teachers, the traditional method as practised today (for more details Palsane and Ghanchi, 1967, may be referred) and microteaching procedure was used. Details of the microteaching procedure are given below :

1. The major objective was to train student-teachers to have more classroom participation and pupil involvement in indirect behaviour. With this end in view two skills, viz. indirect behaviour and rein-

- forcement of pupil participation were taken up for training strategies.
2. In the beginning, a simulated situation was used where the student-teachers formed the class. Each student-teacher in the experimental group was given a chance to practise the skill, receive feedback from the participating student-teachers as well as the investigator working as supervisor. Before the student-teachers was asked to re-teach, a five-minute period was observed, which was followed by a seven-minute critique and a ten-minute plan period.
 3. After two weeks of simulated training, the practice was arranged in the real classroom situation where pupils of Class VIII were involved in the classroom. School teachers were requested to engage the pupils other than the microclass. Started with five minutes of teaching period, followed by seven minutes of critique and ten minutes of plan, and then again the cycle continued. In each period ten pupils formed the microclass and a small concept of social studies lesson as a unit of teaching decided on the previous day in consultation with the supervisor was taught. Each student-teacher gave two lessons in complete cycle—one for the skill of indirect behaviour and another for the skill of reinforcement of pupil's participation.
 4. No gadget like CCRV or videotape was used. The stress was on the controlled and structured observation of the lesson to give feedback to the microteacher concerned.
 5. The teaching performance was assessed through Flanders' Interaction Analysis Category system in the real classroom situation to assess the change in the teacher verbal behaviour through micro-class and for 20 minutes for comparing the performance of control and experimental groups.
 6. The teacher behaviour was measured by observing and analysing the classroom interaction of concerned student-teachers using Flanders' Interaction Analysis Category system (Flanders, 1970).

Measures of Analysis

OBSERVER RELIABILITY : The experiment was conducted by the investigator after due training and after establishing inter-observer reliability consistently at levels or above 0.85. The procedure of estimating reliability was followed as one recommended by Flanders (1960).

MATRIX : The matrix interpretations were made on the lines suggested by Flanders (1960 and 1970). Computational details are also based on the

formulae given therein. The interpretations are based on tally-concentration in specific areas of the matrix. Specific indices aiding interpretations and corresponding areas of the matrix which have been taken as variables to compare the teaching performance are given below.

A. Principal components of communication : Teacher talk ($\tau\tau$), student talk ($\sigma\tau$) and silence or confusion (s/c). Teacher-talk student-talk balance is known as teacher-student talk ratio (τ/s ratio).

B. Flexibility of communication : The index that describes this feature is called steady-state ratio (ssr).

C. Measures of indirect behaviour : These are sensitive areas of the matrix which reveal the positive aspects of social skill in the teacher-pupil relationship involving acceptance of pupils' feeling, praise, acceptance and clarification of their ideas indicating teachers' concern for positive motivation and reward. They are known as I/D, i/d and extended indirect measures of classroom communication.

D. Teacher support to student participation : The measures of 3-3 cell and 9-9 cell indicate concentration of tallies in these cells indicating whether or not the pupils had the opportunity to initiate their ideas or communicate among themselves (9-9) and how far the teacher accepted the pupils' ideas and made use in his teaching (3-3).

Use of t-test

Students' t-tests were carried out on all the 10 variables namely, teacher talk, student talk, silence or confusion, teacher-student talk ratio, steady state cell, I/D, and i/d ratios, extended indirect, categories in '3-3 cell' and '9-9 cell' with a view to identifying whether the measures obtained were significantly different from group to group and pre-treatment and post-treatment dimensions. (Garret, 1969, pp. 223 and 226-228).

RESULTS AND DISCUSSION

Observer Reliability

To check whether the observation performance of the investigator continued to be 0.85 or higher, which is considered to be reasonable level of performance (Flanders, 1960), the reliability was calculated on the basis of data obtained for 20 minutes of observation. It was found to be 0.88.

Comparison of Pre-treatment and Post-treatment Interaction Matrices

To find out the effects of the different treatments, namely, traditional

method of training and microteaching, the pre-treatment and post-treatment matrices were compared for both the groups. The significance of difference in mean score on each variable was found to give the direction of difference between the pre-treatment and post-treatment data along with the levels of significance (See Tables 1 and 2).

Table 1
PRE-TREATMENT VERSUS POST-TREATMENT DATA
OF CONTROL GROUP

<i>Variable</i>	<i>Pre-treatment M</i>	<i>Post-treatment M</i>	<i>M_D</i>	<i>SD_D</i>	<i>SE_{MD}</i>	<i>'t'</i>
Teacher Talk	76.458	67.186	9.077	6.191	1.957	4.638**
Student Talk	5.950	15.995	10.045	4.803	1.518	6.617**
Silence/Confusion	17.464	16.812	.699	10.064	3.182	.219*
T/S Ratio	56.857	4.581	51.474	101.358	32.036	1.606*
Steady State Ratio	82.294	82.474	.183	3.485	1.102	.166*
I/D	.046	.240	.193	.031	.009	21.444**
i/d	.078	.439	.371	.114	.003	123.666**
Extended Indirect	.049	1.167	1.118	.443	.140	7.985**
3-3 Cell	.000	.652	.651	.363	.114	5.710**
9-9 Cell	.098	.111	.013	.170	.053	.245

* Significant at .05 level

** Significant at .01 level

A study of the results of the effect of treatment reveals that because of the training, the pupil participation increased significantly in both the groups. Significant increase in indirect influence is also consistent in the direction of using more and more acts of praising and encouraging the pupils.

Table 2
PRE-TREATMENT VERSUS POST-TREATMENT DATA OF
EXPERIMENTAL GROUP

	Pre- treatment M	Post- treatment M	MD	SD _D	SE _{MD}	't'
Teacher Talk	74.785	73.340	.647	4.421	1.966	.337
Student Talk	5.865	19.691	13.826	6.374	2.850	4.851**
Silence/ Confusion	19.589	6.966	12.623	8.914	3.186	3.166*
T/S Ratio	23.626	3.821	19.825	20.200	9.033	2.194
Steady State Ratio	84.374	67.990	16.383	4.476	2.001	8.187**
I/D	.050	.375	.325	.070	.031	10.516**
i/d	.226	.953	.726	.164	.073	9.945**
Extended Indirect	.049	9.430	9.379	2.185	.977	9.599**
3-3 Cell	.049	3.485	3.436	1.355	.605	5.679**
9-9 Cell	.000	1.079	1.079	.214	.095	11.357**

* Significant at .05 level

** Significant at .01 level

accepting their ideas and building them up. The results indicate that there is significant change in pupil self-initiated talk in experimental group only. This could be attributed to treatment of microteaching. Another interesting and noticeable phenomena is the significant change in communication pattern and the occurrence of silence or confusion in the experimental group. This may be due to the treatment of skill training in reinforcing pupil participation which led to flexibility in communication pattern and leaving less time for the occurrence of silence or confusion. Teacher talk is less than even the normative expectation of 68 per cent of Flanders (1970).

Thus the results indicate that the treatments, viz. traditional method of training and microteaching have resulted into modification of student-teacher classroom verbal behaviour. There seems a need to be distinctive

as which of the treatments compared to the other helped more to modify the teaching behaviour of student-teachers. With this end in view it is considered proper to compare the intergroup post-treatment results.

Comparison of Variables for Significance

With a view to have further probe into the differences on various variables the t-test was used to find the significance of difference. Results are given in Table 3.

Table 3
CONTROL VERSUS EXPERIMENTAL MICROTEACHING GROUP ON THE
BASIS OF POST-TREATMENT DATA

Variables	Control Group		Experimental Group		t'
	M	SD	M	SD	
Teacher Talk	67.106	4.960	73.340	2.647	2.416
Student Talk	15.995	4.224	19.691	3.125	1.613
Silence/Confusion	16.812	12.208	6.966	1.307	2.701*
T/S Ratio	4.581	2.030	3.821	.780	.751
Steady State Ratio	82.478	1.878	67.990	3.082	10.481**
I/D	.240	.040	.375	.074	4.211**
i/d	.439	.013	.953	.023	14.182**
Extended Indirect	1.167	.499	9.430	2.187	10.581**
3-3 Cell	.652	.344	3.485	1.371	5.701**
9-9 Cell	.111	.122	1.079	.216	10.272**

*Significant at .05 level; **Significant at .01 level

Table 3 reveals that student-teachers of the experimental group do not show a tendency to monopolize by their verbalization and remaining in the same category for longer periods. This rapid interchange of verbal behaviour between student-teachers and pupils results in the flexibility of communication pattern, more freedom for pupil participation and initiation. More indirect teacher influence patterns seem to have occurred in the classrooms taught by student-teachers trained through microteaching than the classes taught by student-teachers of the control group. This means that sensitivity to pupil participation and attention to the ideas expressed by pupils are greater for the student-teachers of experimental group. They seem to exhibit a tendency of more acceptance, clarification and constructive use of the ideas and opinions of the pupils, with the result they are encouraged to participate further.

Microteaching Results

From the above, it is clear that microteaching has shown distinctive results compared to the traditional way of training. Keeping this in view, a reappraisal was made of the efficacy of microteaching on the basis of the interaction matrices, prepared for the brief lessons presented by student-teachers concentrating on skill training in real classroom situation. In order to have comparative results of teach, first re-teach, and second re-teach for different variables showing the spurt of growth, i.e. decrease or increase in different variables having teach indices as common denominator, a common scale was found out for each variable. The results can be seen in Table 4.

Table 4
RESULTS OF CONVERTED VALUES AT TEACH, FIRST RE-TEACH
AND SECOND RE-TEACH STAGES

<i>Variables</i>	<i>Teach</i>	<i>Converted Teach Values with Base Teach</i>	<i>First Re-teach</i>	<i>Converted First Re-teach Values with Base Teach</i>	<i>Second Re-teach</i>	<i>Converted Second Re-teach Values with Base Teach</i>
Teacher Talk	65.163	100.00	61.471	94.334	59.433	91.206
Student Talk	28.706	100.00	33.700	117.397	36.538	127.283
Silence/						
Confusion	6.132	100.00	5.036	82.126	4.015	65.476
T/S Ratio	2.329	100.00	1.852	79.519	1.637	70.287
Steady State						
Ratio	70.290	100.00	66.237	94.233	63.668	90.579
I/D	.472	100.00	.513	108.686	.689	145.974
i/d	.788	100.00	.938	119.035	.930	118.020
Extended						
Indirect	6.839	100.00	11.671	170.653	13.428	196.344
3-3 Cell	2.824	100.00	5.234	105.339	5.995	210.871
9-9 Cell	.569	100.00	1.485	260.984	2.227	391.388

The result reveals continuous increase in 'student talk' variable and constant decrease in 'teacher talk' 'occurrence of silence or confusion' and 'teacher-student talk ratio'. The very direction and increase or decrease

show the extent of modification of particular verbal behaviour. The measures of indirect influence have shown steep rise on various variables. Steady state ratio values have shown fall. This indicates that rapid change in the inter communication process during classroom interaction is an improvement to reach those levels of cognitive functioning that require independent thinking and self-direction. Increase in pupil initiation is also in positive direction. Teacher initiation in accepting the ideas clarifying them work as reinforcement to pupils' behaviour. Distinctive efficacy of microteaching as against the traditional method of training may be due to greater specification of the skill to be practised and more objective information and feedback about the performance with the opportunity to re-teach. These features of the teacher-training programme seem to be neglected in the traditional training method to a larger extent.

CONCLUSION AND IMPLICATION

By and large, the experiment has helped to seek the answers of the questions raised and put them as objectives of the experiment. The answers have the educational implications for the teacher-training colleges in particular and education in general. It may be useful for the teacher-training colleges in India to give special attention to this. In the light of the objective the conclusions along with their educational implications are given below.

1. On the basis of the data regarding classroom verbal behaviour of student-teachers there is enough evidence to infer that student-teachers, given the treatment of microteaching, showed significantly different teaching behaviour compared to student-teachers of the control group. Data also suggested the direction in the change of student-teachers' classroom verbal behaviour.

For a pre-service teacher-training programme, inclusion of microteaching as an organized activity needs consideration. The following objectives of skill training may be included : (i) providing reinforcement for the pupils ; (ii) ways that the teacher can vary the stimulus, give emphasis, and maintain attending behaviour ; (iii) set induction, which refers to the ways with which the teacher can create interest in pupils for a unit of study; (iv) lecturing and use of audio-visual materials with attention to variation, pacing, and appropriateness; (v) illustrating and using examples, which refers to moving from simple to complex ideas; (vi) skills of summarizing; (vii) teacher-initiated questions, and (viii) student initiated questions, etc. These are some of the aspects of classroom interaction which seem crucial to effective teaching. With the teach-reteach possibilities, teachers may be

oriented towards component skills of teaching and they may manage a bigger class with more confidence.

2. Obviously, the question of usability of microteaching follows the conclusion that the use of microteaching have shown promising results. But the fact that the traditional practice teaching had an impact is also significant. Although the bountiful good results are evidenced by innovatory technique of microteaching, this may not be prescribed as universal panacea. It cannot replace our traditional practice-teaching. On the basis of the results of the experiment described above, it is a challenge for those concerned with the modification of student-teachers teaching behaviour in the classroom to make an impartial re-appraisal, noting the inefficiency of existing methods of conducting practice-teaching programme and the promise of alternative and supporting approach.

The application of the use of microteaching in the teacher-training programme at present will depend more on the consideration of the existing situation in a particular training institute, and its resources—physical and personnel, initiative, keenness and the level of urgency—with which the staff of a college views the challenge. The proposal of introducing microteaching requires rigorous planning and a lot of cooperation from the supervisors and administrators. Microteaching offers the advantage of both the controlled laboratory environment and the reality of bonafide teaching. If the paucity of practising school, or the situation in the school does not permit, the whole microteaching programme may be arranged in simulated condition which means the opportunities to practise skills in the group of student-teachers themselves. If the school permits, the whole programme may be designed in such a way that a maximum utilization of the resources, time and personnel may be made. The general idea is subject to variation from situation to situation. The size of the class may be manipulated. Duration of the lesson can be lengthened, and the nature of the teaching task may be made more complex. The situation may provide opportunity for a close supervision, practising manageable objectives established according to individual training needs and progress, continuous diagnostic feedback, self-evaluation and immediate guidance in the area of demonstrated deficiency with a probability to repeat a lesson conveniently as often as desirable.

THE FOLLOW-UP

Based upon the experiences and findings of the above experiment, the investigator has been trying to incorporate the idea of microteaching in student-teaching programme. As looking after the teaching of history, the

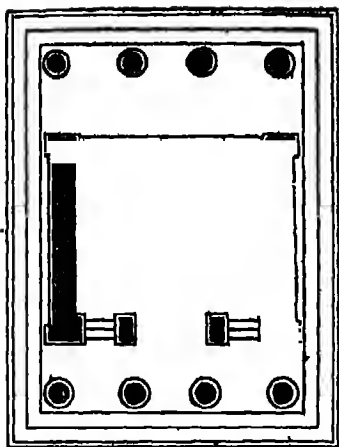
student-teachers offering history as one of the practising subjects are oriented on the theory and practice of microteaching in the beginning. They are also acquainted with different teaching skills so that they may not have any difficulty in practising them in micro-lessons. Model micro-lessons are also arranged. After having oriented to different skills and procedures of the micro-lesson, student-teachers are asked to prepare micro-units in consultation with the supervisor. One student-teacher at a time acts as micro-teacher and rest of the student-teachers act as a micro-class as well as peer observers along with the supervisor. This practice goes on till the student-teachers are sent for practice-teaching programme. Again during the practice-teaching programme the student-teachers teaching history showing marked deficiency in teaching skills are located. Some remedial practice through microteaching is arranged for them. The experience thus gained may help the investigator to prepare a 'mini course' for the development of particular skill for the teachers of history.

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ABSTRACTS OF Ph.D. THESES

A Study of English for the Postgraduate Students of Economics in the Universities of Gujarat

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INTRODUCTION

THIS project aimed at carrying out a student-oriented, need-based, operational research. It was concerned with the needs of the postgraduate students of economics in the universities of Gujarat as regards the comprehension of their subject books in English. It dealt with the solution of a practical problem, viz. the students' inability to get access to knowledge in economics treasured in specialist books in English, and consequently, their failure to use English for library purposes. The study, thus, explored the field of developing English as a library language.

PROBLEM

The study aimed at studying the linguistic patterns—lexical, grammatical, discourse—occurring in the advanced books of economics with a view to

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determining the needs of a postgraduate student who experiences difficulty in reading books of economics in English and who desires to improve comprehension of these books. While listing the patterns his present level of achievement was kept in mind. In the end some attempt at solving his difficulties and enriching his reading comprehension was made by suggesting a course outline and designing exercises on selected passages. The extra-linguistic patterns—mathematical signs and symbols, abbreviations, equations, graphs—which had a high frequency in these texts were listed in the appendix.

METHODOLOGY

A great majority of the postgraduate students of economics in Gujarat have received their entire education through the mother-tongue and are exposed to Gujarati as a medium of instruction and examination even at master's level. Naturally, their competence in English is restricted which hardly enables them to read economics in English. It was necessary, therefore, to assess their reading needs before the project could be finalized. A questionnaire was administered to the students at the outset to ascertain their areas of difficulty in the comprehension of advanced texts of economics. The study of the linguistic patterns occurring in these texts was based on the students' responses.

Compilation of Vocabulary Lists

About 1,700 technical terms of economics and 500 terms of general vocabulary were compiled by analysing the index of the following nine standard books of economics prescribed for the postgraduate students in the universities of Gujarat :

1. *Economics* : P.A. Samuelson
2. *The Theory of Public Finance* : R.A. Musgrave
3. *International Economics* : C.P. Kindleberger
4. *Microeconomic Theory* : C.B. Ferguson
5. *Introduction to the Analytics and Institutions of Money and Banking* : W.J. Frazer and W.P. Yohe
6. *Microeconomic Theory* : G. Ackley
7. *Economic Development* : B. Higgins
8. *Mathematics and Statistics for Economists* : G. Tintner and C.B. Milham

9. *The Social Framework* : J.R. Hicks

The criteria of selection were frequency of occurrence, range and 'disponibility'. The frequency, range and 'disponibility' of a term were explicitly stated in the compiled list.

The main list was supplemented by a list of economics terms suggested by specialists and not occurring in the indices of source books. Thirty-six experts of economics were approached to suggest 30 economics terms on 36 different topics related to the M.A. syllabus in economics. Altogether 700 terms were obtained in this manner of which several were already found in the main list. The remaining items were accommodated in the supplementary list. The items of the list were explained in the vocabulary known to students as far as possible. Meaningful contexts were also provided for these terms so as to ensure their thorough comprehension. The validity of the list was ascertained by means of a vocabulary test administered to post-graduate students of the universities of Gujarat. Every fiftieth term of the list was selected for the test and student's recognition of the term was tested by means of objective questions. Their performance has confirmed the hypothesis that the items of the list did really present difficulties to students.

Discourse Patterns

It is necessary for the students to follow the rhetorical or logical organization of the texts of economics in order to ensure effective reading. A study of the logical patterns typical for the discourse of economics was made keeping in view the needs of the students. Sample passages from the nine standard books of economics were selected for analysis. These consisted of a medium-size paragraph or two from every hundredth page of each source book. The typical conceptual and rhetorical patterns occurring in the texts of economics were enumerated along with the organizational units. These include patterns embodying general concepts of advanced thought and patterns specifying communicative concepts of science.

A test in logical patterns was designed and administered to the post-graduate students of the universities of Gujarat to measure their familiarity or otherwise with these patterns. The test results revealed that they had a poor knowledge of the discourse patterns of economics.

Syntactic Patterns

Sample texts of economics were examined in this section, concentrating

on the complex syntactic structures which were likely to present difficulties to students. These are : (i) non-finite constructions, (ii) embeddings not covered by non-finite constructions, (iii) sentence structure. These syntactic patterns were listed along with their frequency of occurrence.

A test in grammatical patterns was prepared and administered to the postgraduate students of economics to ascertain whether the structures listed in the project were really found difficult by the students. The low test-score confirmed this hypothesis.

Course Outline

An outline of a course which may be designed on the basis of the linguistic patterns listed in the project was given in the end. Three sample passages from the source books representing some of the linguistic patterns listed in the thesis were selected and comprehension exercises including questions on the lexical, grammatical and discourse aspects of the passage set on them.

Extra-Linguistic Material

The textbooks of economics abound in extra-linguistic material. Hence, some of the mathematical symbols and signs, abbreviations and equations which had a high frequency in the source books were listed and explained in simple English in the appendix.

MAJOR FINDINGS

The investigation was undertaken in order to determine the language needs of the postgraduate students of economics who experience difficulties in comprehending the literature of economics in English. Their requirements in the domains of vocabulary, discourse, syntax were studied with reference to nine authoritative advanced books of economics. From this study the following conclusions are drawn :

1. As regards vocabulary, a knowledge of the lexical items listed in the present project, it is hoped, will improve the students' reading comprehension of the books of economics.

2. In the field of grammar, students need to study various types of embeddings which characterize the technical language of economics. Among these are non-finite infinitival and participial constructions, reduced relatives,

complementation, extraposition and compound noun phrases including factive nominals, agentive nominals, question nominals, and abstract nominals. It is also necessary for them to study the sentence structure in depth.

3. For a thorough comprehension of the texts it is not enough to develop competence in English syntax only. Students also need to grasp the structure of the text as a whole and the logical patterns of thought embodied in it. They should be given instruction in the patterns of linking and logical sequence of ideas, opposition, condition, causality, hypothesis, definition, classification, description, explanation, enumeration, evaluation, prediction, and so on. It is also necessary for them to know the *phoric* references, cohesion and equivalence by means of which these rhetorical acts are realized.

4. They need to develop ability in following the extra-linguistic material which is predominantly used in the texts of economics. They should be acquainted with the mathematical signs and symbols and visual material like diagrams, tables and graphs.

5. A study of the linguistic patterns required by students of economics should eventually lead to the compilation of a course, a possible outline of which is provided in the project. The course should be based on the patterns enumerated in the present investigation and aim at improving the students' linguistic as well as communicative competence. In other words, it should enable the students to relate linguistic patterns to the rhetorical and conceptual patterns encoded in the written discourse of economics.

These conclusions, it is hoped, will be useful to some extent in the production of teaching materials for the postgraduate students of economics whose academic success is seriously affected by inadequate English.



The Use of Filmstrips for Teaching Science in Primary Schools

An Analytical Study

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INTRODUCTION

A FILMSTRIP or slidefilm is made up of a series of still pictures arranged in logical order to tell a story, explain an idea, or show steps in process. They are widely used in industrial and technical training. They are used to a large extent in day-to-day teaching in foreign countries. In Japan nearly 80 per cent of primary and secondary schools use filmstrips. One picture or frame can be projected for as long as it takes the teacher to explain it in detail, and the audience to discuss it and ask questions.

Filmstrips save teaching time. A good filmstrip can explain in a matter of minutes ideas, techniques and processes that would take hours to describe. Information can be presented through various techniques of photography, artwork and combination of both. They may be in colour or in black and white. The filmstrip can have as many as one hundred frames or as few as ten depending upon its purpose. A filmstrip is so small and compact that even several filmstrips can be carried in a pocket. The filmstrip projector is light and simple to operate and can be used in a variety of ways in teaching of science.

The small size of filmstrips, easy operation, and possibility of varying the speed of projection to suit the need make it a popular teaching aid. Filmstrips produced for a definite purpose and a specific group are valuable visual aids.

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In India, filmstrips are now produced by some firms in Bombay, Madras and Delhi but they are not yet popular. Only a few secondary schools use them and none of the primary schools use them nor have an idea as to what they are.

Science teaching in India is, in general, characterized by certain special features :

1. It is formal and academic with less emphasis on its human relations.
2. It is more theoretical than practical, and note-taking and the copying of black-board diagrams play a bigger part than experimentation.
3. Demonstration plays a large part.
4. Laboratory equipment is less expensive.
5. Large proportion of less qualified teachers.

Science has received more attention from filmstrip producers than any other academic subject. The general science teacher may find filmstrips of use in :

1. Showing applications, phenomena and similar material, particularly when these cannot be easily demonstrated.
2. Presenting a fund of illustrative material to aid in broadening pupil experience and knowledge of the importance of the sciences in modern everyday life.
3. Providing an efficient means for introduction of new ideas or of currently used in textbooks.

This research project is designed to popularize the use of filmstrips in teaching of general science to Standards V, VI and VII.

OBJECTIVES

The analytical study of the related materials and literature was undertaken with the following objectives :

1. To make a study of the available filmstrips and its projectors. This will include analysis of design, content and their utility and correlation with science syllabus and textbooks.
2. To locate areas in the primary school syllabus wherein filmstrip teaching can be resorted to either to supplement the laboratory work or to revise, present new matter, to stimulate interest, etc.

3. To design new strips where strips are not available at present and try out the strips in teaching with a view to watch their impact.
4. To draw up a plan of popularizing the use of filmstrips in primary schools through various ways.

PROCEDURES

The study was mainly analytical and hence, first, the related literature was collected : (i) catalogues of filmstrips from different producers; (ii) catalogues of State Film Library, Poona and Central Film Library, New Delhi; (iii) list of filmstrips of G.K. Rural Institute and S.M.T. College of Education, Kolhapur; (iv) syllabus of general science by the Government of Maharashtra, NCERT syllabi of general science and discipline-wise science teaching; and (v) textbooks of general science for Standards V, VI and VII produced by the M.S. Bureau of Textbook Production, Poona.

For analysis and evaluation of filmstrips, a form was evolved and filled in for selected filmstrips which have reference to the topics in syllabus. The analysis of syllabus and textbooks was done with criteria for using filmstrips and the correlation of available filmstrips with textbooks and syllabus was analytically studied and the topics were isolated wherein no suitable filmstrips were available.

A list of 20 filmstrip titles were prepared and production of the same was undertaken by studying various techniques of production. Twenty filmstrips on general science are produced which are based on textbooks in Marathi prescribed by the Government. These filmstrips are first of its kind in India as there are no filmstrips available with regional language and which are perfectly based on textbooks. This is one of the most important end-products of this analytical study.

For evaluation of the produced text filmstrips special forms of evaluation were developed. The forms were filled in by teachers after seeing filmstrips. The filmstrips produced were tried on the students of Standard V, VI and VII. This tryout had shown that filmstrip teaching with text film may increase the knowledge of pupils up to 200 per cent without any additional teaching.

Different filmstrip projectors were examined and their technical data also was analysed to find out their suitability for use in the primary schools. An improvised filmstrip projector operating on solar energy was developed as a study of these projectors, taking into consideration the conditions of the primary schools. Statistical information about primary schools, teachers and students was analysed for financial liabilities of supply of filmstrip projectors and filmstrips.

STRUCTURE

The analytical study of the syllabus, textbooks, filmstrips and projectors is designed as follows :

1. Introduction
2. Place of filmstrips in teaching
3. Analysis of general science syllabus
4. Evaluation of Filmstrips
5. Correlating Filmstrips with textbooks
6. Using the filmstrip
7. A plan for frequent filmstrip use
8. Summary and conclusions
9. Appendices, bibliography, designed filmstrips and the filmstrip projector

MAJOR FINDINGS

As a result of this study following major findings can be concluded :

1. Very few filmstrips produced and available at present in India correlate with syllabus and textbooks.
2. Filmstrips correlated with text and in regional languages help to increase the knowledge of students.
3. Almost all topics in the general science syllabus and the textbooks can be effectively and easily taught with the help of filmstrips.
4. The cost of filmstrip will be much reduced if they are produced in large quantities.
5. A filmstrip projector can be used in science teaching with a variety of ways.
6. A single filmstrip containing 35 frames costing at present Rs. 20 is cheaper than 35 wall-charts costing about more than Rs. 100.
7. Filmstrips are produced by experts and hence can assist a majority of less qualified science teachers in the content of science teaching.
8. A low-cost filmstrip projector can be invented with a variety of attachments.
9. It will not be possible to supply these aids (which is the most economic as compared to other sophisticated aids) unless special financial resources are raised by charging a meagre fee from all students.
10. Systematic planning is essential to use the filmstrips in primary schools.

SIGNIFICANCE OF THE STUDY

This might be one of the few studies that have been undertaken in India and even in foreign countries as no such reference is found in the study of reviews of related research studies. Text filmstrips are produced as an outcome of this study which is first of its kind in India.

One of the barriers in using the filmstrip is that the captions are in English. For the first time in India, filmstrips are produced in Marathi. Teachers will definitely appreciate this idea of filmstrips in the regional languages.

In our country everything is produced by imitation of foreign objects. The study shows that a completely new type of projector will have to be developed in India taking into consideration the present conditions and economy of the country.

The study will also help commercial producers of filmstrips regarding the need of the type of filmstrip required.

References from foreign literature have been collected together to help in the production of filmstrip or filmstrip projectors or using them effectively in our day-to-day teaching.

As a result of this study it can be said that if text filmstrips with Marathi captions are used in primary schools it will no doubt, (i) improve the methodology of teaching science; (ii) raise the standard of science education in primary schools, and (iii) develop taste and interest in the younger generation for the science subject.

The study will also help the teachers to (i) select filmstrips for their use; (ii) produce filmstrips of their own; (iii) improvize the projection apparatus they need, and (iv) assist them in visualizing their content to maximum extent possible.



Perception of Characteristics of Innovations as Related to Their Diffusion in Schools of Gujarat

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INTRODUCTION

THIS study was undertaken to find out whether the adopters and the non-adopters of innovations in schools have different reactions to the same innovations and whether all of them have different reactions towards innovations with varying amount of diffusion. An attempt was, therefore, made to study the perception of principals for the characteristics of the innovations of varying degrees of diffusions.

Specifically, the objectives of the study were to determine the characteristics, the perception of which is linked up with the adoption and non-adoption of innovations, and to study whether there is any relationship between the degree of diffusion of innovations and perception of various characteristics in the same innovations and thus to determine the most effective characteristics for adoption and diffusion of an innovation for promotive educational change in schools.

VARIABLES

The dependent or the criterion variables under study were adoption and diffusion of innovations. The other variables under study were the 20 characteristics. They were collected from a number of varied sources—literature, principals, educators and administrators. These 20 characteristics were grouped under three broad categories—the intrinsic, the utility and the situational characteristics. The intrinsic characteristics, which are concerned with the form of an innovation, were named as adaptability, associability, communicability, complexity, divisibility, flexibility, efficiency and structuralization. The seven utility characteristics probed in the study were academic effectiveness, burden, cost economy, pleasure, prestige,

*Thesis submitted to M.S. University of Baroda (1973)

relative advantage and time economy. The situational characteristics, expressing feasibility in terms of the situation in which an innovation is used, were named as compatibility, dependence, facilitation, meaningfulness and practicality. All these characteristics constituted the independent variables. The characteristics were defined and described. The hypotheses with regard to the effect of these 20 characteristics on adoption and diffusion of innovations were framed. The rationale for formulating each hypothesis was based on the study of literature and scrutiny of research findings in the past.

TOOLS

After a preliminary study, 14 innovations were finally selected on the three criteria—awareness, legitimate option and varying diffusibility. A questionnaire was prepared for knowing diffusion of 14 selected innovations and the perception of principals for their characteristics on a five-point scale. The reliability coefficient of correlation of various items in the questionnaire varied from .91 to .96 showing its high reliability.

SAMPLE

The population for the present study consisted of 1,715 heads of the schools sending students to the SSC examination in the year 1971 in Gujarat State. A sample of 120 schools was selected from seven districts at random on various stratifications to make it properly representative of the population.

ANALYSIS OF DATA

After the collection of data from the principals of the selected schools, the questionnaires were scored, data tabulated and analysis of the data was undertaken. The 'Kolmogorov-Smirnov' test technique was used to find out the differences between responses of the adopters and the non-adopters and rank-order correlation technique was applied to look into the correspondence and examine the relationship between the diffusion and the characteristics of innovations.

FINDINGS AND CONCLUSIONS

In the present study, as many as 11 characteristics, as perceived by

PERCEPTION OF CHARACTERISTICS

the principals of schools, are found positively and significantly related with the diffusion of innovations. No such evidence of any relationship was found in case of the nine characteristics. The conclusion showing the specific relationship of the characteristics with the diffusion of innovations are as follows :

1. Communicability is perceived in a greater degree by adopters in 13 out of the 14 innovations. The coefficient of correlation ($p=.67$) between diffusion and communicability is significant at .01 level. The perceived communicability of a new idea, therefore, affects the adoption and the extent of diffusion.

2. Simplicity is perceived in a higher degree by the adopters in 11 out of 14 innovations. The coefficient of correlation ($p=.73$) between diffusion and simplicity is significant at .01 level. The perceived simplicity or complexity of an innovation, therefore, affects the adoption and the extent of diffusion.

3. Divisibility is perceived in a higher degree by the adopters in eight out of 14 innovations. The coefficient of correlation ($p=.81$) between diffusion and divisibility is significant at .01 level. The perceived divisibility of an innovation, therefore, affects the adoption and the extent of diffusion.

4. Efficiency is perceived in higher degree by the adopters in 13 innovations. The coefficient of correlation ($p=.73$) between diffusion and efficiency is significant at .01 level. The perceived efficiency of an innovation, therefore, affects the adoption and the extent of diffusion.

5. Structuralization is perceived in a higher degree by the adopters in 13 innovations. The coefficient of correlation ($p=.90$) between diffusion and structuralization is significant at .01 level. The structuralization of a new idea, therefore, affects the adoption and the extent of diffusion.

6. Academic effectiveness is perceived in a higher degree by the adopters in 12 innovations. The coefficient of correlation ($p=.67$) between diffusion and academic effectiveness is significant at .01 level. The perceived academic effectiveness of an innovation, therefore, affects the adoption and the extent of diffusion.

7. Prestige is perceived in a higher degree by the adopters in 12 innovations. The coefficient of correlation ($p=.72$) between diffusion and prestige is significant at .01 level. The perceived prestige of an innovation, therefore, affects the adoption and the extent of diffusion.

8. Relative advantage is perceived in a greater degree by the adopters in all the 14 innovations. The coefficient of correlation ($p=.87$) between diffusion and relative advantage is significant at .01 level. The perceived relative advantage of a new idea, therefore, affects the adoption and the extent of diffusion.

9. Facilitation is perceived in a higher degree by the adopters in 11 innovations. The coefficient of correlation ($p=.93$) between diffusion and facilitation is significant at .01 level. The perceived facilitation of an innovation, therefore, affects the adoption and the extent of diffusion.

10. Meaningfulness is perceived in a greater degree by the adopters in all the 14 innovations. The coefficient of correlation ($p=.81$) between diffusion and meaningfulness is significant at .01 level. The perceived meaningfulness of an innovation, therefore, affects the adoption and the extent of diffusion.

11. Practicality is perceived in a higher degree by the adopters in all the 14 innovations. The coefficient of correlation ($p=.79$) between diffusion and practicality is significant at .01 level. The perceived practicality of an innovation, therefore, affects the adoption and the extent of diffusion.

12. There is lack of evidence of any significant relationship between the diffusion of innovations and perception of adaptability, associability, flexibility, burdensomeness, cost economy, pleasure, time economy, compatibility and independence in each case.

In general, therefore, an innovation to be adopted and get diffused, it must appear to the heads of schools to have their intrinsic characteristics, namely, communicability, complexity, divisibility, efficiency and structuralization, the utility characteristics, namely, academic effectiveness, prestige and relative advantage, and the situational characteristics, namely, facilitation, meaningfulness and practicality. More the perception of communicability, simplicity, divisibility, efficiency, structuralization, academic effectiveness, prestige and relative advantage by the principals, the greater is the likelihood of its adoption and the extent of diffusion.



Social Interaction among Principals, Teachers and Students in Higher Secondary Schools of Himachal Pradesh

A Sociometric Study

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INTRODUCTION

EDUCATION aims at an all-round development of human personality by bringing out the best in man. Personality can best be developed through social interaction with other human beings. School, like any other social organization, provides a good deal of opportunities for social interaction among its members which go a long way in the development of human personality. However, steady development can be ensured only if we understand the nature of social interaction going on in the schools and also the variables influencing the patterns of social interaction among the members in a school. Keeping these facts in view, the present study was undertaken.

STATEMENT OF THE PROBLEM

The present study was stated as follows : Sociometric Study of the Patterns of Social Interaction among Principals, Teachers and Students in Higher Secondary Schools of Himachal Pradesh.

DEFINITIONS OF THE TERMS USED

1. *A Sociometric Study* : This term refers to a study which is concerned with attractions and repulsions between the members of a school.

*Thesis submitted to Punjab University (1977)

2. *Patterns of Social Interaction* : This term in the present study has been confined only to the basis on which the members in a school associate or not associate with others, and have hostile or cordial relations with others in a school.

3. *Situational Interaction* : The term situational interaction in the present study refers to the social interaction among the members in a school under the seven situations pointed out in 'the situational interaction questionnaire'. It aims at finding out the hostile or cordial interaction among the members in a school.

4. *Positive Social Interaction* : This term refers to the interaction among those persons who associate with others and give their choice in favour of those persons.

5. *Negative Social Interaction* : It refers to the interaction among those persons who do not associate with others and, thus, give their rejection against those persons.

6. *Total Social Interaction* : This term refers to positive as well as negative social interaction taken together. Positive social interaction means how much others associate with a person. Negative social interaction means how much others do not associate with a person. Total social interaction means how much a man is considered by others. Any person having a poor total social interaction will, thus, be neglected by others.

AIMS OF THE STUDY

The present study is a comprehensive one which deals with the patterns of social interactions taking place among school personnel. It has, thus, following aims :

- (a) To study the following social interactions :
 - (i) The patterns of social interaction between principals and teachers.
 - (ii) The patterns of social interaction between principals and students.
 - (iii) The patterns of social interaction between teachers and students.
 - (iv) The patterns of social interaction among teachers.
 - (v) The patterns of social interaction among students.
- (b) To have a comprehensive picture of the patterns of social interaction in different types of schools.
- (c) To offer suggestions, if warranted by the data, for the healthy development of social interaction in the schools.

SAMPLE

The study was restricted to two urban and two rural schools. Out of the two urban schools, one was boys' school and the other was girls' school. Both of the rural schools were co-educational. It may be mentioned that all the rural higher secondary schools in the state are co-educational. The total sample consisted of four principals, 118 teachers and 405 students from one section each of Classes IX, X and XI.

TOOLS

The tools of the research were classified into two categories : Firstly, those which other researchers designed for their own works, and secondly, those which the present researcher designed for the present study. The former were standardized one and latter were the non-standardized. A list of both the categories is as follows :

Standardized Tools

<i>Sr. No.</i>	<i>Name of the Area Explored</i>	<i>Tools Administered on Students</i>	<i>Tools Administered on Teachers</i>
1.	Personality adjustment	Saxena : Personality Inventory	Bell : Adjustment Inventory
2.	Socio-economic Status	Kuppuswamy : Socio-economic Status Scale (Urban) Pareek and Trivedi : Socio-economic Status Scale (Rural)	Kuppuswamy : Socio-economic Status Scale (Urban)
3.	Values	Kulshrestha : Study of Values	Kulshrestha : Study of Values

Non-Standardized Tools (Self-prepared)

1. A sociometric interaction questionnaire to principals, teachers and the students.
2. A situational interaction questionnaire to teachers and students.

ANALYSIS OF DATA

The data collected was analysed as follows :

1. The data was summarized by preparing $N \times N$ sociometric matrices.
2. The sociometric data, thereafter, was interpreted in terms of the variables taken in the present study. Computer was also used for computation of the results.

3. Three-point social-distance scales were used for measuring the social distance in the social interaction between principals and teachers, and also between principals and students.

4. Firstly, the patterns of social interaction taking place in all the schools in the sample were studied collectively, and then those were compared with the patterns of social interaction as found in urban and rural schools and boys' and girls' schools.

5. The following statistical formulæ were used for the computation :

(i) Chi-Square

$$(a) \quad X^2 = E \left[\frac{(fo - fe)^2}{fe} \right]$$

$$(b) \quad X^2 = \frac{fo^2}{fe} - N \text{ (for } 2 \times 2 \text{ fold contingency tables)}$$

(ii) Gama

$$\gamma = \frac{Efa - Efi}{Efa + Efi}$$

(iii) Linear Correlation

$$r = \frac{NEXY - EX XEY}{\sqrt{NEX^2 - (EX)^2 \quad NEY^2 - (EY)^2}}$$

FINDINGS

1. The patterns of social interaction as found in the total sample were also prevalent in urban, rural, boys' and girls' schools barring minor variations which generally did not effect the patterns observed in the total sample.

2. There was much similarity in the patterns of social interaction of the principals as well as those of the students with the teachers. Both the principals and the students pointed out more positive than negative social interaction with the teachers who yielded greater power of exchange in social interaction with them.

4. Principals pointed out social interaction only with the students of Classes X and XI. However, the principals in the rural schools pointed out no social interaction of any type with the students.

4. Teachers pointed out much more total social interaction with the students whom they thought in comparison with those whom they did not teach. Similarly, students also pointed out much more total social interaction with the teachers who taught them in comparison with those who did not teach them.

5. Tendencies of sex-segregation and sex-antagonism were found both in the teachers and the students in their social interaction with each other. However, these tendencies were greatly modified where both, the teachers and the students found it more useful to interact with the opposite sex than of their own.

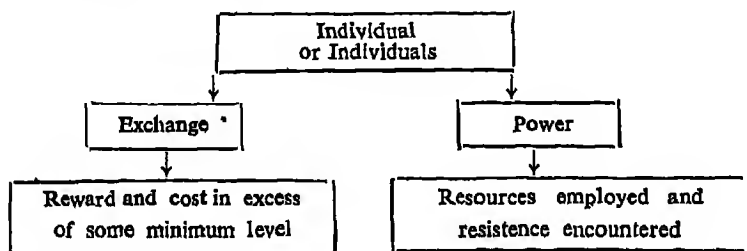
6. There was high positive association between positive social interaction among the teachers and their designation, qualifications, and personality adjustment. However, there was no association between negative social interaction among the teachers and their designation, qualifications, and personality adjustment. There was no association between positive and negative social interaction among the teachers and their age, experience, caste and situational interaction. Sex-segregation and sex-antagonism were observed in the teachers of both the sexes. The teachers in the second grade of socio-economic status pointed out much more total social interaction with the teachers of their own grade in comparison with what they pointed out with those in the third grade of socio-economic status. In contrast, the teachers in the third grade of socio-economic status pointed out much more total social interaction with the teachers in the second grade in comparison with that of their own grade. As for values, barring a few exceptions, there was no statistically significant relationship between the values of teachers and their social interaction among themselves.

7. The students pointed out much more total social interaction with the students of their own class in comparison with what they pointed out with those outside the class. There was no association between social interaction among the students and their caste and personality adjustment. There was high positive association between the socio-economic status of the students and their positive social interaction among themselves. However, as for negative social interaction, there was no association. There was high association between social interaction among the students and their scores on the situational interaction questionnaire. Complete sex-segregation was observed in the girls. As far as boys were concerned, sex-segregation and sex-antagonism were observed in them. Like the teachers, in case of the students also, barring a few exceptions, there was no statistically

significant relationship between the values of the students and their social interaction among themselves.

CONCLUSION

On the basis of the above findings it was concluded that the present study vindicated the assumptions of only two theories of social interaction : Firstly, the exchange theory, and secondly, the power theory. In the light of these theories, the general patterns of social interaction among principals, teachers, and students in the higher secondary schools of Himachal Pradesh were presented as follows :



To explain further, the social interaction in the higher secondary schools begins when an individual (or individuals) attempts to gain some benefit from another individual (or individuals) by exchanging something with him. If the other individual also believes that he will be benefitted from such an exchange the social interaction takes place. Social interaction, initiated in this way, continues as long as the reward—cost—outcome is in excess of some minimum level. The individual who provides higher rewards at minimum cost to those with whom he interacts will receive more positive social interaction in comparison with that who supplies small rewards at high costs. Furthermore, power of exchange is determined by the resources employed by an individual and the resistance encountered by him. More the resources an individual employs and less the resistance he encounters, more the positive social interaction he receives.

SUGGESTIONS

The following suggestions were made on the basis of the findings and the conclusions drawn out by the present study :

The role of principals is of great importance in creating cordial social

interaction in the schools. The principals, therefore, should be given some training in human relationship before their appointments.

The teachers in the oldest age-group (49-58 years) and experience-group (27-35 years) should be required to undergo certain reorientation courses, and attend educational seminars, workshops and conferences. The persons who enter the teaching profession should be imparted effective pre-entry training. The above steps will make the oldest and the youngest teachers much more acceptable to the principals as well as to the students.

The following steps should be taken in the schools in order to develop cordial and frequent social interaction among principals, teachers and students :

(i) The principals should make efforts to develop cordial and intimate social interaction with the teachers. He should have both formal and informal social interaction with them.

(ii) The principals should also take pains in developing healthy and intimate social interaction with the students. They should try to understand and solve the problems of the students and should watch and guide their activities.

(iii) The teachers should not only confine themselves to imparting some relevant information to the students but should also take interest in solving their problems. This will bring both of them nearer. By doing so, the problem of indiscipline, which has assumed alarming proportions everywhere in the country, may perhaps be easily understood and even tackled.

(iv) Such activities as, break the barriers of designation, qualification and socio-economic status among the teachers may be pursued in schools. In various school committees, teachers of all the categories should be included so that they may get opportunities for frequent social interaction among themselves.

(v) The house-system should be vigorously pursued in schools. A school should be divided into various houses. The students from all the classes should be included in each house. Some of the teachers should also be the members of each house. The Office-bearers among the students should be elected from all the classes. Every house should follow its own co-curricular activities. There should be periodical competitions among different houses. This will bring the students and teachers nearer to each other and spread their social interaction among all the students of the school.

(vi) Steps should be taken to eliminate the feelings of caste discrimination among the school-personnel. Situations should be provided for community meals in the schools. Such stories as highlight the equality among all the human beings and condemn the concept of untouchability

must be included in the syllabi prescribed for the students.

(viii) In the curricular as well as co-curricular activities pursued in a school, opportunities for frequent social interaction between both the sexes should be provided. Single sex activities should be discouraged. This will help in removing the tendencies of sex-segregation and sex-antagonism among the school personnel.

To sum up, after explaining the nature of the patterns of social interaction among the principals, teachers and students in the higher secondary schools of Himachal Pradesh and pointing out some of the important bearings of the findings of the present study on education, it may be mentioned that the most important contribution made by the present study is that by studying the patterns of social interaction among the principals, teachers and the students by taking them as one unit, it has, perhaps, opened the field and called attention to many problems in this area of research which remained untrod so far.



The Applied Nutrition Programme

A Survey

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INTRODUCTION

THIS is a study regarding the working of the applied nutrition programme (ANP) in India in general and Maharashtra in particular. This is basically an educational programme in respect of protective food production, preservation and consumption at family level. This programme is for the welfare of the family, village, community and the nation. This is a programme to solve the problems of malnutrition and under-nutrition in the community, specially of the vulnerable group of the rural population like pre-school

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APPLIED NUTRITION PROGRAMME

and school-going children, pregnant and nursing mothers through nutrition education. People should know how and what to produce, how and what to consume for good health, which is the base of all success of an individual.

Different schemes of ANP have not shown remarkable success towards the achievement of objectives of ANP. Some of the schemes of ANP, more or less failed because of various reasons. The investigator has been involved in this scheme since the inception of ANP in Maharashtra and came across the different activities of ANP as a teacher at the training centre where he felt the necessity to evaluate it. Accordingly, he has selected the present problem and studied it carefully under two heads: (i) The survey of the ANP, and (ii) the experimental approach through schools.

The study covered the following main objectives :

1. To evaluate the working of the agreed points under the Master Plan of Operations—review the general working of the programme, particularly the training and nutrition education, organizational and administrative arrangements and coordination between different functionaries.
2. To see how the programme has created nutritional awareness and how far the people have benefited through this programme and, thus, to find out the general impact of ANP on the villages.
3. To suggest ways and means to improve the present working of the programme.
4. Recommend the design or designs for reorganization of ANP through schools for securing more effective implementation of the programme.

APPLIED NUTRITION PROGRAMME

In February 1963, the Government of India, UNICEF, FAO and WHO signed the plan of operations for ANP in India. This document is known as the Master Plan of Operations (MPO). This plan of operation, which a State Government would negotiate with international agencies, would be subsidiary to the MPO. Generally, all State Governments have adopted subsidiary plans of operations before 1970. The main objectives of ANP are : (i) To impart education in nutrition through different agencies and schemes, (ii) to create awareness about the food nutrients and their role in good health, (iii) to create awareness in production of protective foods, (iv) to promote sound and hygienic practices for the storage, preservation and use of protective foods, and (v) to stimulate self-help in this regard.

(i) Coordination and Administration

The coordination and administration of this programme have been organized and implemented in accordance with the requirements as laid down in Article III of the MPO through the Ministry of Food and Agriculture, and Irrigation Department, Government of India. At the State level, generally, the Rural Development Department has been responsible for the coordination of the programme. There are coordination committees at the Central Government level as well as State level, consisting of departmental heads. At the district level, the District Collector or in case of Zila Parishads, the Chief Executive Officer will be responsible along with the subject heads. At the block level, the Block Development Officer will be responsible and Panchayat Samiti members will cooperate with him. At the village level, Panchayat members and village functionaries are responsible.

(ii) The Component of Applied Nutrition Programme

The ANP is composed of different activities which can be divided into three groups : (i) Education and training; (ii) production of protective foods, and (iii) food consumption. The ANP is basically an educational programme to impart education at all levels. The functionaries of all types are trained at different training centres to make the programme effective. It is of no use to ask the people to eat more protective foods, like milk, fish, eggs, fruits and vegetables unless we assure their production in sufficient quantity. Therefore, schemes like, dairy, poultry, fishery, horticulture are organized under the ANP. Fishery includes inland as well as coastal; horticulture includes gardening scheme like, school gardens, community gardens and kitchen gardens. People should be aware of food elements and the manner of getting them by adopting the cooking methods. To bring about the desirable changes in dietary habits of the people, particularly in vulnerable groups of the population, is one of the principal objectives of the ANP. This is practised through cooking and feeding demonstration programme.

Horticulture activities are closely related to agriculture of the villagers. Kitchen-gardening is not new to them, only the need is to develop it by providing technical guidance and materials like seeds, etc. In the ANP school gardens more emphasis should be given on education and the school syllabus must be linked with garden activities. The idea of a community garden is to develop improved practices of agriculture in the villages, specially in the growing of protective foods. At the initial stage these gardens are supported by all possible means by UNICEF, FAO and the government

for establishing them permanently on a sound economical basis. Other production schemes are also organized on the same lines as horticultural schemes, for developing interest among people for the production of more protective foods.

(iii) Community Participation

Unless the community itself is convinced of the usefulness of the activities of the ANP and unless the community is involved in planning and carrying out the activities, the programme will not succeed.

In selecting the villages and making the village schemes, the BDO should consult the Panchayat Samiti of the Block and he will then be able to assess the problems and resources of villages and together with the villagers, decide the activities to be started. The selection of the villages and activities should be planned in such a way that they continue even after the operational period is over. Local officials and villagers must consider carefully the local conditions, resources and needs and then decide themselves the best plan.

Village organizations such as Mahila Mandals, youth clubs, play an important role in the ANP. Members of these organizations will receive special training to organize such activities as community gardens, nutrition education, Balwadis, etc.

SURVEY TECHNIQUE AND PROCEDURE

To understand the present condition of the ANP the investigator has conducted the survey in a selected area. He has selected ten ANP blocks from three districts of Maharashtra. From these blocks, 88 villages and respective village schools as well as four training centres have been included in the survey for a deep study. The personnel involved in the survey were beneficiaries as well as functionaries at various levels. Besides, the first-hand information as stated above, the investigator has discussed with the authorized and knowledgeable personnel to make his opinions clear.

A survey is taken for the purpose of ascertaining the prevailing conditions. It seeks to answer the question. What are the real facts with regard to the existing condition? The survey method of research finds expression through a variety of techniques. In this study the following six survey tools were adopted during the survey: (i) Questionnaire, (ii) question schedule, (iii) interview, (iv) observation, (v) discussion and (vi) documentary study.

EXPERIMENTAL TECHNIQUE AND PROCEDURE

The investigator recommends the design for reorganization of ANP through schools to secure more effective implementation of the programme. For this purpose he has selected two school groups, one for control and another for experiment from two blocks of Kolhapur district, namely, Bhudargad and Radhanagari. Radhanagari is an ANP block where ten village schools were covered under this scheme during 1967-68 under the Rural Development Department of Maharashtra. Out of these ten villages, only two schools—Nartavade and Sarvade—were selected as an experimental group by the random selection method. Then, another two schools—Kavalow and Rashivade—from the remaining eight schools were taken as a control group. Thus, for the experiment, out of the ten ANP schools from the Radhanagari block, four were selected, two for experiment and two for control.

Similarly, four schools, two for experiment and two for control, were selected from Bhudargad block as non-ANP schools. While selecting the schools as stated above, the similarity in respect of natural conditions, location of the villages and schools as well as cooperation from villagers and teachers was considered.

STATISTICAL TECHNIQUE FOLLOWED

In this study, the investigator has followed different statistical techniques : (i) The experimental villages of Radhanagari block were selected by the random method. (ii) To measure the subject knowledge, the measuring devices must be valid and reliable, otherwise the measurement has no value. Therefore, the investigator framed the four tests and established their reliability and validity before applying the tests to judge the performance of the pupils. The correlation coefficient for the present tests ranged from 0.65 to 0.70. This correlation coefficient is called a validity coefficient. This correlation coefficient may be said to be high. The reliability of a test is the accuracy with which it measures what it proposes to measure. The reliability coefficient of the present tests was calculated by test-retest method. It ranged from 0.88 to 0.92 which may be said to be high. (iii) The test scores of four tests were calculated by the statistical method called 'Analysis of Variances'. Then, the variance ratio was calculated.

EXPERIMENTAL ACTIVITIES

The experimental activities conducted in schools can be called the

school ANP. These school ANP activities can be divided into three parts on the basis of participation of the teachers, parents and school children.

The teachers from experimental schools were contacted and the object of the research work was explained to them and they were requested to help the investigator to conduct the school ANP in their respective schools. Then, a printed booklet *The School ANP*, prepared by the investigator in the local language was given to all teachers for reading and giving their personal opinions.

All activities were closely related to the school syllabus and hence the teachers and pupils benefited rather than suffered. During the school visits the investigator also participated in school activities and guided the teachers and pupils and also observed the responses from them.

Participation of parents was considered an important factor in school activities to stimulate the children to become more active. The parents of experimental schools were contacted through their respective school children. In the beginning, the investigator visited the concerned families, along with the respective school children and gave them an idea about the school ANP and requested them to participate. The printed pamphlet consisting of principles of ANP was given to the parents during the home visits. Then, the notes based on school activities were given to the parents through their children. The parents were contacted from time to time whenever possible through their children or school teachers and requested to pay attention towards the school ANP.

The school children from Classes V, VI and VII of the experimental schools were involved in these activities because these school children can understand and convey the messages to their family members. To achieve the objectives of the experiment the following activities were conducted through schools : (i) layout of the plots, (ii) study of crops, (iii) growing vegetables in pots, (iv) making the compost manure, (v) study of kitchen-gardening, (vi) kitchen-garden competition, (vii) a visit to the river, (viii) a visit to the vegetable farm, (ix) debating the essay competitions, (x) eating-habit formation, (xi) recording the daily food, (xii) talks from experts, (xiii) lessons on food stuffs, (xiv) demonstration of low-cost nutritious recipes, (xv) exhibition, and (xvi) filmstrips.

EVALUATION OF EXPERIMENTAL APPROACH

Evaluation is indispensable in any educational programme. Without evaluation, it is impossible to say whether a new approach in present teaching is a success or otherwise. Generally, all factors except teaching

of new activities were approximately the same in both the school groups. The difference of knowledge in-between the control and experimental groups proves or disproves the effectiveness of the new approach.

Tests were conducted to find out the knowledge received by the school children. In all, four tests were given to both the groups and assessed by the investigator himself. With the help of these data, the variance ratio for each test was calculated by the statistical method called the 'Analysis of Variance' with the help of the following five steps :

1. The total sum of squares.
2. The sum of squares within groups.
3. The sum of squares between groups.
4. Degrees of freedom.
5. The variance ratio. This was indicated by the letter 'F'. The F-value was compared with the table values at five per cent and one per cent levels of significance.

To evaluate the attitudes of the school teachers towards the new approach, the questionnaire was prepared and questions were asked before starting the new activities and at the end of the study. The questions were asked in the same order and in the same manner at both the times. The teachers were given an opportunity to talk as freely about the new approach as they could. There are 30 school teachers in four experimental schools. Their attitudes towards this programme in the beginning and at the end of the study were taken into consideration for comparison. The comparison was based upon the particular question or questions before starting and at the completion of the study. The answers were recorded as accurately as possible.

For the study of impact on parents, the investigator selected the school children from the experimental group of schools, and thereafter their respective families. Thus, there were 172 total families, included from four villages for this study from the beginning to see the effectiveness of the new approach.

The approaches and methods used for imparting the nutrition education and awareness were : individual contacts, home visits, group discussions and supplementary notes. In a family the parents include the father, the mother and elder members. The comparison was based upon the percentage of parents answered or observed for that particular question at both the times—initial and final—as in the case of school teachers. The opinions or answers of these parents were recorded as accurately as possible and the data were classified under five general headings.

RESULTS AND DISCUSSIONS

The study was based on two aspects : (i) survey of the ANP, and (ii) experiment in the schools. The major findings of the survey and experimental results are summarized below.

The survey was conducted in ten blocks and 88 villages and schools, selected from three districts of Maharashtra and four training centres, and supported by the information available with various agencies involved in implementing the ANP at the national and the state levels.

There are three types of gardens in the ANP. The object of setting these gardens is educational rather than commercial. The chief objectives behind the school garden is to create an active interest among the school children to produce more protective food. The ANP needs a coordinated approach in gardening at village level, aiming to utilize the produces for proper feeding programme. But, unfortunately, though the ANP is being implemented in the Maharashtra State, since 1965, this stage has not yet been reached in any one of the blocks noticed by the investigator. The performance of school garden has not been found satisfactory due to lack of proper facilities and poor interest of the school teachers. The general conditions of school gardens observed during the survey are given in details.

While discussing with the school teachers, the investigator observed that there was no remarkable difference between the trained and untrained teachers in respect of attitudes towards the ANP. It was noticed that at the time of gardening, the teachers in charge of practicals, never paid attention towards the educational aspects. This was mainly due to lack of understanding of the educational values of the school gardening among all concerned teachers and officials of the Education Department. It was noticed that the trained teachers from the ANP schools were transferred to non-ANP schools without any provision in former schools. The trained teachers were not satisfied with the training that they had received at the training centres because of many reasons.

During the village survey, it was found that nobody was interested in the ANP scheme. Nobody knew the exact responsibility in this programme due to lack of proper guidance. The following general opinions of the villagers were observed by the investigator : (i) The ANP is a good programme but training and funds should be strengthened ; (ii) A full-time specialized person should be appointed to guide the villagers ; (iii) the village schools could be nutrition education centres ; (iv) the supplies given through blocks were always delayed and not suited to their village conditions ; (v) the villagers should be properly convinced of the scheme before it is introduced in the villages.

During the survey, awareness of the ANP was found statistically signi-

ficant but awareness regarding its implementation was very poor. It was due to lack of coordination and cooperation between the functionaries and other duties they have to perform. The general complaint of the block officials was that the interest of the Panchayat Samiti members in the ANP mainly confined to the selection of villages and distribution of the schemes among the villages. After these decisions were taken, the Samiti members were indifferent to the working of the programme.

It was observed that in none of the blocks, health agencies were associated with the ANP in any manner, and as a result other block officials including members of Panchayat Samiti were displeased with non-participation of health agencies. It was also observed that the training and experience in the ANP was not taken into account by the State departments while posting the block officials. Most of the officials were of the opinion that the administrative pattern must be changed and the duration of the operational period as well as funds should be expanded. Almost all block officials who had received training in the ANP thought that the training needed improvements. They gave two main suggestions : (i) extension of the training period, and (ii) emphasis on the practical aspect in the training. The majority of the block officials were of the opinion that there was no harm to hand over the ANP to the Education Department as the ANP is a basically educational programme.

The intention behind the survey at the training centres was to know the present position of the training in respect of (i) awareness of the ANP among the staff members of the training centres, (ii) difficulties in imparting the training, (iii) syllabi, and usefulness of the training, (iv) present facilities at the training centres, (v) different views of the trainers and trainees, etc.

Unfortunately, none of the staff members of training centre had shown interest in the ANP. A number of staff members did not know the syllabi and basic principles under the ANP. Almost all staff members told that they were busy in their regular duties and the ANP teaching was an additional duty for them. Their general complaint that trainees were not interested in this training and attendance of non-officials was poor. Most of the staff members were of the opinion that special qualified teachers should be appointed to hold the complete responsibility of the ANP training. However, they were of the opinion that the ANP could be handed over to the Department of Education.

After discussion with the trainees it was observed that the training they were taking is useless because of the poor possibility of the activities in their blocks or villages. They were of the opinion that training should be strengthened as per the local requirements. Some of them told that training should be related to their job responsibility. Their most urgent

demand was for good literature on the ANP as training centres were handicapped in this respect. It was observed that all types of trainees were not satisfied with training facilities available at present.

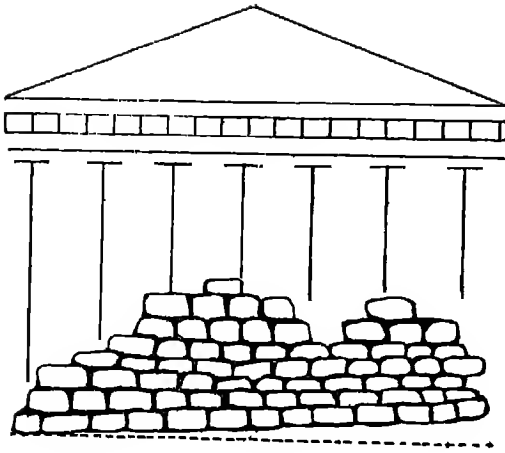
Most of the state as well as district level officials showed a poor awareness of the ANP and various strategies adopted to achieve the objectives. Consequently, they hardly contributed anything to the implementation of the ANP. On the contrary, lack of interest and knowledge on the part of these officials often had adverse effects on the commitments of block staff to the programme. Almost all officials agreed that the ANP had not taken roots in the process of development of the community. The basic idea of educating the rural people in nutrition through production of protective food had not yet been understood by the functionaries at all levels.

The majority of the knowledgeable personnel agreed that the present administration pattern should be changed because in the present pattern nobody was held responsible. Some of them suggested that as the programme is basically educational, there is no harm in handing it over to the Department of Education. The experienced personnel told that knowledge like, diet, nutrition, extension education and community development must be possessed by the administrative officers of this programme. Some of officials told that the scheme may be continued and production aspect should be separated.

EXPERIMENTAL RESULTS

The second part of research work was the experiment conducted in the selected village schools. The analysis of data shows that there was no statistical difference in the two groups at the time of pre-test but, subsequently, three tests were highly significant. This difference in-between the two groups of school children was due to new activities introduced in experimental schools. Thus, it is proved by the statistical method that the new approach of the ANP in the schools was proper, and it can be introduced in the schools as a part of the school curriculum.

In the beginning, teachers were doubtful about the effectiveness of the new approach but at the end all of them were of the opinion that the ANP can be included in the school syllabi. This change was due to the new approach of the experimenter. It was noticed that the teachers were satisfied at the end of the study and told that due to new activities in their schools, the regular school study got improved rather than suffered. The impact of the new approach upon the parents was also good. Almost all final responses from the parents were statistically significant.



Research Notes

The Organization and Working of School Complexes in Kerala

An Investigation

K.N. LALITHAMMA
M.R. BRAHMANANDAN

THIS study attempts to probe into the details of the organization and working of school complexes in Kerala. The tools used were questionnaires, interviews and observations. One hundred and ten heads of secondary schools and 200 teachers in component schools in Kerala formed the sample for the study.

The idea of using school complexes to improve educational standards in primary schools by linking a certain number of primary institutions with a centrally located high school in the locality, has been experimented in the Kerala State for over a decade now. The idea was first mooted by the Education Commission (1964-66) and was adopted by the Government of Kerala. The State has succeeded in using this set-up for the diffusion of new ideas and practices to all its primary schools. The concept that a high level institution has an obligation to disseminate educational know-

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ledge and ideas regarding current innovative practices to the lower level institutions is now fairly well accepted by the educationists in the State. Now the programme has been in effective operation for nearly a decade and a very pertinent question that needs to be answered in this connection is: To what extent has the programme succeeded in its set objectives?

An objective assessment of the working of the programme would definitely throw light on both the strength and weaknesses of the programme and provide adequate guidelines for making the programme more effective and significant. The present study is basically intended to assess the effectiveness of the programme in relation to two main aspects—organization and working.

OBJECTIVES

The objectives of the present study classified under the two broad headings—organization and working—are given below.

A. Organization

- (i) To find out the number of schools in which the programme has been organized and its organizational pattern.
- (ii) To find out the details relating to the proximity and the number of the component schools served by each complex.
- (iii) To find out the number of teachers who have received training relevant to the conduct of school complex programmes.

B. Working

- (i) To find out the appropriateness and nature of the scheduling and the centres selected for individual programmes.
- (ii) To find out the major area of difficulty of the personnel involved in the programmes.
- (iii) To find out the extent of participation of the teachers and others involved in the programmes.
- (iv) To find out the relevant details of the programmes in relation to the nature of the activities, expenses and methods of evaluation used.

METHODOLOGY

Tools Used

1. **QUESTIONNAIRES** : Two questionnaires, one for collecting information from the heads of secondary schools, and another for collecting information from the teachers of the component schools, were used for the study.

A preliminary questionnaire consisting of 65 items was prepared for the heads of secondary schools. The items were classified under certain definite categories such as background information relating to school, the organizational details of the school complex and the working of the school complex. The final questionnaire was prepared on the basis of the draft questionnaire initially tried out. Another draft questionnaire was also prepared for the teachers in the component schools and after the try-out the final questionnaire was prepared.

2. **INTERVIEWS** : A second source of data was interviews with experts in the field such as Assistant Educational Officers (AEOS); District Educational Officers (DEOS); Deputy Directors of Education, Director of State Institute of Education, Director of Public Instruction, Director of Research and Studies and Chairman of the State Advisory Board of Education. These interviews were mostly semi-structured.

3. **OBSERVATIONS** : The investigator visited four schools in Trivandrum city and observed school complex activities and prepared notes relating to the vital points under study.

4. **SUBJECTS** : The questionnaires prepared for the heads of secondary schools were sent to all the heads of secondary schools in Trivandrum educational district and 441 heads of secondary schools in the remaining 27 educational districts of Kerala. Only 122 completed questionnaires were received back. The questionnaire intended for the teachers of component schools were administered to all the lower primary and upper primary schools in Trivandrum educational district and to 525 schools (378 lower primary and 147 upper primary) in the remaining 27 educational districts. Only 200 questionnaires were returned for analysis.

ANALYSIS OF DATA

The data collected through the questionnaires, interviews and observations were tabulated and analysed statistically to throw light on the objectives of the study.

FINDINGS

The main findings of the study are summarized below :

1. The study revealed that only 68 per cent of the schools covered by the study have organized school complex programmes. It was also seen that more of the government schools have organized school complex programmes than the private schools. The maximum number of school complexes were conducted during the year 1970-71. There is no uniform organizational pattern for conducting the programmes. Nearly 76 per cent of the schools under study have indicated that the organization of school complexes is decided by a special committee constituted for the purpose. A large majority of schools (80 per cent) have organized subject councils to assist the running of the programme. Usually the seniormost high school assistant in a group acts as subject leader in the organization.

2. The number of component schools in the complexes was found to vary from 1 to 21 and the number of school teachers in the component schools varied from 10 to 200. It was seen that some of the units under study are too big to be effectively managed, while some others are too small to have any potentiality for independent existence. The opinion of the heads of schools regarding the optimum number of component schools in a group varied from 3 to 10. Many of them (72 per cent) have stated that the number of component schools in a complex should be less than six while 63 per cent of the group have reported that the number of component school teachers in a complex should be ideally between 40 and 81.

The majority of the schools studied (84 per cent) have component schools within a radius of 8 kms. and five per cent of the nucleus schools have reported that they are having component schools which are more than 11 kms. away from their location.

3. Only 23 per cent of the nucleus schools covered by the study have teachers who have received any training in complex activities. The number of trained teachers in different schools varied from 2 to 8. None of the headmasters of secondary schools under study has undergone any special training relevant to the conduct of school complex programmes.

B. Working

1. The majority of the schools (74 per cent) have reported that they are conducting school complex meetings on working days and usually half

working day is utilized for the purpose. The reason given for this choice is that the teachers will not attend such courses if it is fixed on a holiday

A vast majority of the nucleus covered by the study (93 per cent) conduct the school complex meetings usually in the nucleus schools itself. When it is held in a centre other than the nucleus schools, a convenient place is selected on the basis of an agreed plan, adopted in an earlier meeting. It is interesting to note that almost 90 per cent of the component schools prefer to organize the meeting in the nucleus schools for the simple reason that such institutions are better equipped and have the needed facilities for conducting the envisaged activities.

Thirty-seven per cent of the schools covered by the study indicate that they conduct the general body meeting once in a year; 23 per cent once in six months; 31 per cent once in three months and 9 per cent once in a month.

2. The important difficulties facing the working of school complex programmes are : (a) the paucity of time on the part of heads of nucleus schools, and (b) the lack of special training for conducting school complex programmes.

Eighty-three per cent of the component schools have stated that they have not experienced any difficulty in attending the school complex programmes conducted at centres other than their own schools."

3. Eighty-five per cent of the nucleus schools have reported that the attendance of teachers in the school complex meeting is found to be satisfactory. Seventy-seven per cent of schools covered by the study have stated that the attendance of teachers of component schools is almost satisfactory. Eighty-nine per cent of the nucleus schools have reported that attendance is compulsory for all the members of a school complex and if a teacher has to absent himself, he should obtain the previous permission from the concerned heads of schools. Eighty-three per cent of the component schools have reported that they are attending the school complex programmes regularly. Ninety-seven per cent of the nucleus schools have suggested that the attendance in the meeting can be increased by improving the activities of school complex and explaining its importance to the constituent institutions.

4. Eighty per cent of the nucleus schools have organized subject councils and more meetings are conducted in core subjects than in languages. In 50 per cent of the complexes where subject councils have been organized, it is found that the subject conveners do not visit the component schools and only in 30 per cent of cases they visit component schools regularly. The majority of the subject conveners do not visit the component schools because of lack of time and finances.

SCHOOL COMPLEXES IN KERALA

The activities are organized to give more importance to curricular activities than general activities. It is also seen that more importance is given to demonstration classes and model lessons than general activities such as library services, laboratory services and inservice courses.

Twenty per cent of the complexes studied have reported that they have no financial commitment and others have reported that they have financial commitment in relation to the working of school complexes out of these seven per cent have reported that in many cases, the respondents themselves meet the expenses and 93 per cent have revealed that the expenses are met by the members of the concerned school complexes.

Seventy-five per cent of the nucleus school teachers and 91 per cent of component school teachers consider the school complex programmes as worthwhile and important. Twenty-four per cent of nucleus schools have reported that they are getting better children from the component schools after the introduction of school complex programmes. It was further seen that almost all the officers in the department are heavily burdened with routine work so that it is difficult to spend time and energy for the new programme.

In seventy per cent of the nucleus schools studied, the DEOs have checked the work of the school complex activities at the time of annual inspection.

Some of the important suggestions for improving existing programmes (which emerged from the study) are indicated below.

(i) Special training in organizing school complex programmes should be given to both heads of nucleus schools and subject conveners of school complex programmes. The training should of course be evolved in relation to the special conditions in schools and the difficulties experienced.

(ii) Heads of nucleus schools should be given more administrative powers in relation to the planning and conduct of the work. This will minimize several administrative difficulties which would hinder the operation of the programme.

(iii) There should be an independent machinery to organize, execute and evaluate the programmes. There should also be a single organization at State level for evaluating the work in the whole State at specified intervals of time.

(iv) Attempts should be made to make the school complex programmes more meaningful and acceptable. This can be done by encouraging worthwhile activities and experimentation, giving adequate publicity to innovative practices and also by liberalizing the rules relating to attendance, payment of T.A. and D.A. and such other service benefits for those who participate in the work.

(v) Necessary literature regarding school complexes should be developed when a programme is completed and distributed to all the schools in the State so that there will be proper dissemination of innovative ideas and practices to other complexes.

(vi) The heads of nucleus schools and subject conveners should be given opportunities to visit the component schools and assess how far the new ideas which have been developed through the complex meetings are actually put into practice.

(vii) The DEOs and the AEOs should make it their professional responsibility to visit the school complex meetings and keep in touch with their activities and operations.

(viii) The DEOs, while visiting the schools for annual inspections, should be authorized to supervise the school complex activities and assess the working of the system.

(ix) DEOs should persuade the heads of nucleus schools to send periodical reports (six monthly reports) on the working of the school complexes.

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Low Academic Achievement and Emotionality

A Study

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INTRODUCTION

EDUCATION plays a vital role in building up the society. Modern societies cannot achieve their aims of economic growth and higher cultural standards without making the most of the talents of their citizens. Though education as a social activity has had a theory and a practice since the dawn of history, yet, we have depended much on educational thinking and practice, evolved in other countries. It has now been recognized that we should start building up an edifice of knowledge pertaining to educational thought and practice grounded in our national thinking in all fields of education.

In spite of the rapid rise in the enrolment numbers in the recent past, the 'unsuccessful' group and 'under-achievers' form a sizeable proportion. Even the Education Commission (1964-66) has shown concern with the problem of low-achievers. However, not many investigations into this important problem have been conducted. Moreover, intellectual factors in academic achievement of the pupil have been generally emphasized. The importance of other areas are gradually being realized and scientists are now generally agreeing that besides the intellectual equipment of the student, the relatively unknown areas of personality in general and specifically emotionality holds the key to the problem of low achievement in education.

Eysenck had found that 'unsuccessful' student of average intelligence lacks persistence and emotional stability. Nirmaljit Sidhu reported emotionality having evil effect on academic achievement of adolescent girls. Durganand Sinha conclusively pointed out that under-achievers lack emotional adjustment. High school level study conducted by Clyde Breeze reported positive relation between effective factors and academic achievement.

The relative importance of the factor of emotionality and the paucity of research in Indian setting based on this field has evoked interest in the present investigator to undertake the present study. This paper is an

*The investigator is grateful to Mr. Sree Ram Murthy, Lecturer, College of Education, for his guidance in conducting this study.

attempt to study whether emotionality is related to low academic achievement.

METHOD AND MATERIAL

Any attempt to measure the influence of emotional factors on academic achievement must consider the role played by variables as intelligence and socio-economic factors such as educational level of parents, economic status of the family, etc. Therefore, in selecting the sample, care was taken that they were appropriately matched for the above variables. From 500 subjects (250 boys and 250 girls) with low academic achievement, selected from different schools in the twin cities of Hyderabad and Secunderabad, a homogenous sample was selected based on age, sex, intelligence and socio-economic status. To ensure uniformity of evaluation standards, marks secured at the Class X Board examination were taken into consideration. To control the age factor, care was taken to see that students approximately within the age-range 13-16 years were selected.

As regards the intelligence, Otis-Quick Soring Mental Ability Test; Gamma form AM (for senior high school and colleges) prepared by A. S. Otis was used. This test consists of 80 items arranged in an increasing order of difficulty. Its reliability is reported to be .96 for all grades combined. The split-half reliability is .86, validity is .86. The above selected students with low achievement group falling in a required age-range were further selected on the basis of scores in intelligence test and those falling in the range of $\text{mean} \pm 1 \text{ SD}$ were selected for the study based on the analysis of socio-economic schedule, a broad categorization was made keeping in view the educational level of the family, the economic aspect and the size of the family.

The subjects were thus inevitably eliminated on intelligence groupings, age, socio-economic background and subjects absented themselves for each of these tests, from those basically selected with low academic achievement. The resulting core group of 250 subjects (130 boys and 120 girls) formed the homogenous sample which was tested for emotionality. Emotionality-calm scale of Henry Clay Smith consisting of 40 statements was presented in an objective way for assessing the pattern of feelings and behaviour associated with the trait of emotionality.

RESULTS AND DISCUSSIONS

The obtained scores on the emotional-calm scale were converted and

arranged on the norms scale. Having calculated the mean and standard deviation for the total number of boys and girls separately, those falling below the mean and $\frac{1}{2}$ standard deviation constituted the emotional group; those above mean and $\frac{1}{2}$ standard deviation constituted the calm group and the subjects in between the range of $\text{mean} \pm \text{or} - \frac{1}{2} \text{ S.D.}$, i.e. between the highest point of emotional group and the lowest point of the calm group formed the middle group. Coefficient of correlation of each group with academic achievement was then calculated.

Table 1
THE OBTAINED THREE GROUPS AND THE COEFFICIENT OF
CORRELATION OBTAINED FOR BOYS

<i>Group</i>	<i>No. of Boys</i>	<i>Correlation Coefficient</i>	<i>Degrees of Freedom (N-1)</i>	<i>Level of Significance</i>
Emotional	50	.825	49	0.01 level
Middle	50	.550	49	0.01 level
Calm	30	.130	29	Not significant either at .01 or at 0.05 levels

Table 1 suggests that the high positive correlation between emotionality and low academic achievement in case of boys; significant correlation between the two variables for the middle group and insignificant relationship between calmness and low achievement was found.

Table 2
HIGH NEGATIVE CORRELATION BETWEEN EMOTIONALITY AND LOW
ACADEMIC ACHIEVEMENT

<i>Group</i>	<i>No. of Girls</i>	<i>Correlation Coefficient</i>	<i>Degrees of Freedom</i>	<i>Level of Significance</i>
Emotional	40	— .85	39	.01 level
Middle	40	.70	39	.01 level
Calm	40	— .25	39	Not significant either at .05 or .01 levels

Table 2 suggests that in case of girls emotionality may result in high achievement which could form an interesting topic for further research.

Table 3
SIGNIFICANCE LEVELS OF MEAN DIFFERENCE BETWEEN
EMOTIONAL, MIDDLE AND CALM GROUPS (BOYS)

<i>Group</i>	<i>Mean Difference</i>	<i>SE of Difference</i>	<i>CR</i>	<i>Degrees of Freedom</i>	<i>Level of Significance</i>
Emotional and Middle	24.74	3.1	7.98	98	.01 level
Calm and Middle	19	4.42	4.52	78	.01 level
Calm and Emotional	40.74	4.824	8.4	6	.01 level

Table 3 reveals that the mean difference for these groups is significant at 0.01 level and hence the difference within each other is real and not a matter of chance.

Table 4
SIGNIFICANCE OF MEAN DIFFERENCE BETWEEN EMOTIONAL, MIDDLE
AND CALM GROUPS (GIRLS)

<i>Group</i>	<i>Mean Difference</i>	<i>SE of Difference</i>	<i>CR</i>	<i>df</i>	<i>Level of Significance</i>
Emotional and Middle	14.9	3.19	4.6	78	0.01 level
Middle and Calm	21.25	5.95	3.57	78	0.05 level
Calm and Emotional	36.20	12.4	2.92	78	Not significant

Table 4 shows that amongst girls their difference between emotional group and middle group is real, between middle and calm group is significant at 0.5 level but difference between emotional and calm group is insignificant and hence the difference may not be real. Certain sampling errors might have contributed to such insignificant result and the study could be repeated in case of girls as already stated above.

Table 5
TESTING DIVERGENCE OF OBTAINED RESULTS AGAINST
THE NULL HYPOTHESIS (BOYS)

	<i>Emotional</i>	<i>Middle</i>	<i>Calm</i>
Observed (fo)	50	50	30
Expected (Fe)	43	43	43
(Fo - Fe)	7	7	13
(Fo - fe) ^a	49	49	169
fo	1.13	1.13	3.9
$\therefore X^2 = 6.16$ $df = 2$ P lies between 0.05 and 0.02			

Table 6
TESTING DIVERGENCE OF OBTAINED RESULT AGAINST
THE NULL HYPOTHESIS (GIRLS)

	<i>Emotional</i>	<i>Middle</i>	<i>Calm</i>
Observed frequency (fo)	40	40	40
Expected frequency (fe)	40	40	40
(fo-fe)	0	0	0

As seen from Table 6, X^2 value is 0 and insignificant and hence the null hypothesis is retained in case of girls.

Table 7
COMPARISON OF BOYS AND GIRLS' EMOTIONALITY
RELATED TO ACHIEVEMENT

<i>Group</i>	<i>Girls</i>	<i>Boys</i>
Emotional Group :	40	50
Score range	30-43.4	18-30
r=between achievement and emotionality	-.85	.825
Middle Group :	40	50
Score range	50-55	40-50
r=between achievement and emotionality	-.70	.55
Calm Group :	40	30
Score range	65-90	55-70
r=between achievement and calmness	-0.25	-0.13

Table 7 reveals that though the differences between two groups are not highly marked and at certain points there is almost negligible correlation as between the middle group and the academic achievement but girls are more emotional than boys as revealed by the high score range in all the three groups.

CONCLUSIONS

The present study indicates that

1. Emotionality in boys is significantly responsible for low academic achievement.
2. The girls are more emotional than boys.
3. Further, though the distribution in the three groups has been equal for girls more boys are emotional than calm.
4. In case of girls there exists a negative relationship between emotionality and academic achievement.



Teaching of Second Language

Some Readings in Psychology

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PEOPLE dispute the validity of generalizations based on experiments conducted on animals. They claim that men have several factors—heredity, environment, judgment, thinking, adaptability and creativity—which are absent in animals. Experiments on animals give no clue to verbal behaviours. Any generalization from such studies on animals will be an over-simplification. Chomsky observed :

Human beings use language whereas other animals do not. It is no use applying principles of learning that have been derived from research with animals to explain a form of behaviours that animals are not capable of.¹

Researches on acquisition of the second language were mainly carried on by the English-speaking countries and concerned the acquisition of languages such as French, German and Russian. In most cases, the subjects were Europeans. It would be over-simplification if we assume their findings to be correct in the case of Asians and Africans, especially when the teaching in developing countries lack the advantages of educational technology. The teacher of English is surprised by the limited amount of guidance available. He wants some ready-made rules which can be effective in the circumstances in which he teaches. What he finds, instead, is a vast ocean of words! These have very little relevance to his work. It is like expecting a nurse to be proficient in midwifery by training her in first-aid. Moreover, what sounds good linguistics turns out to be bad psychology! Teaching is a pragmatic business. We cannot wait for the mist to clear or the controversies to settle down. One has to be eclectic.

This paper lists a few of psychological factors which have a direct bearing on language teaching. The variables can be studied along two axes. (The author has no knowledge of Cartesian linguistics—he confesses.) On one axis, we have factors such as motivation, memory, forgetting, transfer, etc. while on the other, we have the variables of individual differences such as age, sex, personality, etc. The two axes are not rigidly perpendicular in our problem; they crisscross each other on several points, e.g. motivation is related to age so is memory to interest. One cannot be studied in total isolation. Yet, for delimiting the scope of the paper, we will concentrate mainly on one axis.

There is a gap between the laboratory and the classroom teacher. Nothing is gained by ignoring this gap. Nor is anything gained by learning theorists mocking educational psychologists—and vice-versa.²

In the light of this, let us examine theories.

¹Chomsky, Noam, Quoted by Wilkins, *Linguistics in Language Teaching*, MIT Press, Cambridge

²Bugelski, B.R., *Psychology of Learning*, Henry Holt, 1959

Motivation

Motivation is a general term that encompasses those states of the individual under which he attends to certain aspects of his environment. As a result, his behaviour is both initiated and directed. It is said that motives have an energizing function and a directive function.³

In spite of such assertion, motivation is under fire. It is even misunderstood. "Hilgard suggests that understanding motivation is perhaps even more imperative than understanding learning itself."⁴ Hull (1943) established an equation showing motivation as an element in learning:

$$S^{\pm}R = S^{\pm}R \times \text{Drive} \\ (\text{excitatory potential}) = (\text{habit} \times \text{drive})$$

If the drive is zero, the result is zero.

Hunt first enlists two claims of motivation and then refutes them—"Assumption: (i) all behaviour is motivated, (ii) that organisms became inactive unless stimulated. A large variety of observations contradict this assumption and imply spontaneous molar activity."⁵

Ausubel sides with gestaltists when he says that meaningful learning is more effective because it works on intrinsic motivation: "... because of its inherent potency, and because meaningful learning automatically provides its own rewards."⁶

This discussion automatically brings us to the concept of reward and punishment, i.e. the law of effect. Behaviourists and field theorists are divided on this. For behaviourists reinforcement and hence the effect of reward and punishment is a must. Thorndike, Hull and Guthrie have divergent opinions. Tohman, though a behaviourist, sides with field theorists and makes a circular statement which can be interpreted either way.

Numerous studies have shown that learners usually respond to encouragements. However, it is believed that both encouragement and discouragement are essential. It depends on teachers how to use them. "Reward may be more effective at the beginning of a series of learning trials and punishment more effective during the final phase of learning."⁷

Lambert has viewed this factor in the social context. The two types of

³Skinner, C E. (Ed.), *Educational Psychology*, Prentice-Hall of India, 1970

⁴Bugelski, *Psychology of Learning*, Henry Holt, 1959

⁵J. McVicker Hunt, Gordon Ira (Eds.), *Human Development*, 4-6

⁶Ausubel, *Educational Psychology—A Cognitive View*, Holt, Rinehart & Winston

⁷Murata, Ed. by Ruch, Floyd L., *Psychology and Life* (Scott, Foresman), Tarapore-Vala & Sons (Indian edition), 222

motivation (intrinsic and extrinsic) are rechristened as (i) instrumental, and (ii) integrative in learning a language.

"The orientation is instrumental in form if, for example, the purposes of language study reflect the mere utilitarian value of linguistic achievement such as getting ahead in one's occupation; and is integrative if, for example, the student is oriented to learn more about the other cultural community.⁸ Teaching of English and Hindi in our country have both such values.

For Wilkins, motivation applies to the first language learning alone: "... of the child learning his first language, it could be said that it has the best of motives for learning the language. It enables him to get what he wants."⁹

It is said that teacher is his own guide. Psychologists have not given their verdict clearly. In the second language-learning (especially English) instrumental as well as integrative approach will be an asset and both prove their importance.

Perception

Psychologists have perceived this concept differently and the debate goes on. Behaviourists and mentalists suggest different approaches. Behaviourists regard 'perception' as a mentalic concept, hence it is beyond any observable and verifiable analysis. Drive reduction does not presuppose that 'goal-directed' behaviour is a behaviour with 'sign expectancy'. Mentalists, on the other hand, claim that the learner has a capacity to perceive; the cognitive ability enables him to 'see in whole', analyse and choose his path. For them learning is not conditioning but insightful. The methods suggested by them are diametrically opposite. If one believes in conditioning, drills and practices are emphasized. The more one practices, the more he learns till the response becomes a habit, and learning is a habit-formation. Mentalists, on the other hand, think that learning must be a meaningful activity. The learner must be able to 'discover' that there is a pattern in the drill; there is a rule governing a particular behaviour. He will develop insight. He 'internalizes' the rules and learns with understanding.

In the habit-formation we 'feed' information bit by bit (learning in parts). We teach words in isolation. Mathematical operations are taught

⁸Lambert, *Teaching of English as Second Language* (Eds.), Allen and Campbell, (TMH edition), Indian second reprint

⁹Wilkins, *Linguistics in Language Teaching*

one by one. The learner reads a sentence and masters it, then he goes to another. In learning 'as a whole' the learner perceives the whole pattern not word but sentence, not sentence but the whole paragraph. The poetry is not learnt stanza by stanza but as a whole. The strategies in learning would also be different. For the behaviourists learning is drive reduction, responding to a stimulus. He is not aware of the problem ; his immediate worry is to respond to the stimulus presented. What might follow next is non of his concern. In the 'problem-solving' approach, the learner takes the problem as a challenge ; he plans his action not for one operation but for several.

The method you follow will depend on your understanding of the sensory process. If you think that listening alone is enough you would follow the lecture method. If you feel that listening should be synchronized with visual part you choose the other : Do the two 'senses' work together and reinforce each other or interfere ? This decision would lead you choose the medium—the audio (radio) or the visual (slide projector) or the audio-visual together (TV or movie).

Language Development

In their early language development children learn first to express their wishes and then to name objects and ask questions about them. At first, the phonetic pattern of children's speech is so unlike that of adults that few except their mothers are able to understand them .. When they first came to school such children have considerable difficulty in making themselves understood.¹⁰

Children's speech also differ grammatically and systematically from that of adults. Towards the end of the second year they speak in short two-three word sentences consisting mainly of nouns and verbs, prepositions and conjunctions being omitted (McCarthy, 1930) sentence increases in length from about four word each at three years to seven and a half words at eight years (Tamplin, 1957) grammatical errors, at first frequent, decrease in number ; sentence become more complex in structure and subordinate clauses begin to appear.¹¹

It is generally agreed that children understand speech before they speak themselves ... It is difficult to judge how soon and to what extent children hear phonetic patterns of single words and understand their meanings.¹²

¹⁰Vernon, *Human Development* (Ed.), Ira Gordon, p. 178

¹¹ibid., 180

¹²ibid., 180

With growing menace of sound pollution—cinema, TV, songs, tapes, etc. McCarthy's and Tamplin's findings seem outdated. The younger generation now grasps language at a tremendous rate. My daughter (just 2) can sing 10-15 film songs (full sentences with intonations) and my son (7) can give number of dialogues which contradict Tamplin :

Middle class children, especially those from educated homes, become accustomed to hearing 'formal language', more complex and more logical language, conveying the finer shades of meaning and expressing feeling and wishes more subtly and indirectly.¹³

Kellmer Pringle (1960) found that children brought up in institutions, without close personal contacts with adults, were particularly backward in their ability to understand and to express themselves in speech. Their linguistic development was slower than their intellectual development.

'The part v whole' problem becomes significant when a child begins to learn reading. He cannot isolate words out of their contexts.

The child hears sentences as wholes...He is not clearly aware of the words as isolated and independent entities. Still less is he aware of the particular letter sounds within the word...Unfortunately, in the English language the vowels have many different sounds, and the child may be unable to tell which is the correct one until he has sounded the whole word.¹⁴

Do children understand the 'meaning' of the words they pronounce? Some regard that children enjoy the 'fun' of repeating a new word. The so-called 'naughty' and 'obscene' pronouncing is not for the sake of meaning but for the fun of repeating a newly acquired word. "The problem of meaning in language is a problem of learning."¹⁵

Guillaume (1927) and Carroll (1939) have suggested that this learning (morphology and syntax) comes about when the child learns 'phrase wholes' (sequences of words in grammatical patterns) as single-patterned entities and then learns to 'differentiate' parts. "In a sense, then, the child learns the grammar of his native language in somewhat the same way that the linguist analyses that grammar by finding the substitution groups or from classes."¹⁶

¹³Ibid., 180

¹⁴Ibid., 181

¹⁵Carroll, J.B., *The Study of Language*, Harvard University Press, 1961, 99

¹⁶Ibid.,

Learning the Language

Behaviourists have no special theory to explain language requisition. For them, language learning is similar to other learning such as how to type. Mentalists have an elaborate argument. They argue that human beings are endowed with an internal capacity for language. This capacity must be innate. They label this capacity as 'language acquisition device' (LAD). How does it operate? The device enables him to formulate hypotheses about the structure of language. The child, though unconscious of process, tries and tests hypotheses. Constant checking is a step towards internalizing grammar. This is 'insightful' learning of language. This acquisition is permanent and transferable.

Transfer brings us to the learning of second language. When we teach vocabulary of the target language we simply give him a substitute for a word in his mother-tongue. The concept is already there, e.g. 'ghost' as a concept is already known—he simply substitutes 'ghost' for *bhoot*. In the new language also he tries and tests hypotheses. If the two languages have some common feature his ability to generalize is greater. But, when the target language differ greatly, he encounters failures—negative transfer. When similar features do not exist, the child tries to discern some pattern in the new language. For example, a learner of English will try to form a hypothesis about the past inflection of verbs. With a small number of verbs at his command with his limited knowledge he hypothesizes that verbs take—'ed' as inflection (talked, walked, barked). But soon he comes to know about took, went, had. He generalizes that some words have regular past inflection while others have irregular. This generalization is a reliable guide and whenever he comes across a new verb he will ask whether it belongs to the regular category or the irregular category.

If we don't accept this capacity and continue to believe that foreign language learning is acquiring a new mode of behaviour, we are not making use of learner's past experience of his capacity to generalize. We are, then, teaching them new habits for new conditions. Rivers in her experiment with audio-lingual method had following assumptions :

- I. Foreign language learning is basically a mechanical process of habit-formation.
 - (a) habits are strengthened by reinforcement,
 - (b) language is behaviour ..and behaviour can be learned only by inducing the learner to "behave".
- II. Analogy provides a better foundation for foreign language learning

than analysis'.¹⁷

How does the audio-lingual method operate? Ausubel holds : "The audio-lingual method seeks to avoid the mediating role of the native language . . . It attempts to accomplish this objective through the rote-learning of phrases and through the inductive learning of syntactical rules; through direct association of second language words and phrases with objects, pictures and situations rather than with native language words." Ausubel regards deductive learning of grammar more efficient in foreign language teaching:

No time is wasted in discovery and both the generalization and the experience of applying are two appropriate examples, transferable from the very beginning of practice. As a precisely, explicitly and abstractly stated preposition, a grammatical generalization also holds wider transferability.

Summing up the controversy, Wilkins tries to strike a balance:

We can agree that in some sense the learner is producing his internal grammar. But our experience suggests that the environment that we create for learning has a considerable effect on how well the children are able to use the language. It seems feasible that the rule producing mechanism is assisted by our programming its exposure to the language.¹⁸



¹⁷Rivers, Wilga, *Psychologist and Foreign Language Teacher*

¹⁸op. cit.

Creative Functioning in Relation to Personality, Value-orientation and Achievement Motivation

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INTRODUCTION

RESEARCH in the field of creative behaviour has shown that creative performance in science does not depend only on certain cognitive characteristics and operations. It is apparent in the statement of Vinacke (1952) that these cognitive characteristics do not function in isolation, but rather in relation to a total personality system of needs, attitudes, motivations, values, goals and emotions. Realizing the importance of non-cognitive characteristics even Guilford (1967) proposed that consideration be given to what motivates individuals in terms of needs, interests and attitudes that help the individuals to be productive and creative. Bloom (1963) in an extensive research of the cognitive dimensions associated with scientific creativity, concluded "rather reluctantly that personality and motivational factors are at least as important as aptitude in determining performance". Roe (1951) also suggests that personality factors are crucial in the development of creativity.

After making an extensive survey of literature of creativity, Dellas and Gaier (1970) made a summary statement that creative persons are distinguished more by interests, attitudes, values, motives and drives than by intellectual ability. Certainly, there are certain stylistic, motivational and personality characteristics of creative science students which operate as important determinants in the realization of their potentialities. Hudson (1966) has adopted an extreme position by suggesting that the roots of creativity do not seem to lie in convergent or divergent thinking, but rather, in the personality and motivational aspects of character.

In India, research on such aspects of scientific creativity is limited and sparse. Inquiries have been made by various people responsible for identification and development of creativeness about "what generalization can be made concerning the personality requirements for successful innovation and invention" (Bhattacharya, 1965). These relatively unexplored research problems in addition to others provide the basis for

present investigation because a knowledge of the characteristics which differentiate between the high and low creative students have major importance in the development of curriculum, counselling, student activities and teaching strategies. Hence this study was undertaken to study systematically personality structure, value-orientation and need for achievement of the high and the low creative students of science.

PROCEDURE

Subjects

The subjects of this study were enrolled in Class IX (science group) in a school of Muzaffar Nagar, U.P. Since sex, age and educational status have been recognized as important variables in researches on creativity (Helson, 1961, 1969; Torrance, 1965; Wallach and Kogan, 1965; Wallach and Wing, 1969) necessary steps were taken to obviate the effects of these, if any, in the present study. Ss were drawn from middle class socio-economic status (Kuppuswamy, 1961), having mean age 14.56 years and belonging to the same sex (male). The subjects (96) were classified into four groups, based on creativity index and intelligence score, viz. the high creative—high intelligence, the high creative—low intelligence, the low creative—high intelligence and the Low creative—low intelligence. Although the primary interest of the present study essentially concerned creativity alone, reflection of the interaction of this ability and intelligence is also indicated. This leads to a consideration of intelligence as a suppressor variable.

Instruments

Basic tests of divergent thinking abilities used in this study were Torrance Tests of Creative Thinking (1966) and scored for fluency, flexibility and originality. These factors seem to represent the basic abilities most conspicuously involved in creative production (Merrifield, Guilford and Frick, 1961). Jalota's (1960) test of general mental ability was used for determining the IQs. The Hindi version of Eysenck's MPI test by Jalota and Kapoor (1971) was used for determining introversion-extraversion.

The sentence completion test, a forced choice inventory developed by Mukherjee and adapted by De (1970) in Hindi, was used for studying the achievement motivation in the Ss. For studying the value-orientation, a scale of values developed in Hindi by Bhatnagar (1963) on the lines of Alport-Vernon-Lindzey scale of values was used.

ANALYSIS OF DATA

As described above, the subjects were classified into four groups based on their joint standing on creativity index and intelligence score. In order to determine the difference between high and low creative, 2×2 analysis of variance was done. This analysis was done to seek answer to the question of the different behavioural traits hypothesized in the present study constitute a systematic function of creativity, intelligence and a combination of them. In this way the extraversion scores of MPI, achievement motivation scores and the scores on theoretical and aesthetic values are treated individually.

FINDINGS

In order to study personality structure of the high and the low creative students, Eysenck's MPI was used and scored for introversion-extraversion. Table 1 shows that the high creative individuals are introvert in comparison to the low creative individuals. The two groups are significantly different from one another.

Table 1

Source	Df	Ms	F	P
Creativity	1	364	5.87	.05
Intelligence	1	110	1.77	NS
Interaction	1	143	2.30	NS
Error	92	62	—	—

The data for the two value dimensions employed in the present study were subjected to analysis with the results of Tables 2 and 3.

Table 2

Source	Df	Ms	F	P
Creativity	1	329	6.207	.05
Intelligence	1	256	4.83	.05
Interaction	1	40	1.0	NS
Error	92	53		

Table 3

Source	Df	Ms	F	P
Creativity	1	137	5.27	.05
Intelligence	1	47	1.87	NS
Interaction	1	39	1.50	NS
Error	92	26	—	—

It is clear from the above Tables that high creative individuals are significantly higher on theoretical and aesthetic values as compared to the low creative individuals.

In order to study achievement motivation, the sentence completion test was used and it was found that the high creative individuals are more achievement-motivated than the low creative individuals (Table 4).

Table 4

Source	Df	Ms	F	P
Creativity	1	111	9.25	.05 & .01
Intelligence	1	127	0.58	.05 & .01
Interaction	1	13	1.08	NS
Error	92	12	—	—

DISCUSSION

The sample for the final investigation consisted of 96 adolescents for whom the complete data on all the variables under study were available. The operational definition of extraversion as used in this study represents sociability, liking for parties, having many friends, need to have people to talk to, disliking for reading or studying by oneself.

The data for the two value-dimensions—*theoretical* and *aesthetic*—employed in the present study was subjected to analysis. The *theoretical* value-dimension reflects empirical, critical, rational and intellectualistic tendency on the part of individual. It is because of this that intelligence has turned out to be significant here. The mean score for high creativity group is found to be 57.50 while for the low creativity group, it is, 40. This shows a positive effect of creativity on the theoretical value. The results of the study thus indicate that the high creative individuals possess significantly higher degree of theoretical value. This is in confirmation with

the findings of Walberg and Welch (1967); Mackinnon (1961); Yamamoto (1963), and Parmesh (1970).

In case of aesthetic value the mean score for the high creativity group is found to be 45, while for the low creativity group it is 36.5. The analysis of variance shows a significant effect in case of creativity on aesthetic value and effect of intelligence and creativity on intelligence interaction is not significant.

Creative activity involves the problem of motivation, aptitude as well as the temperament. General needs are behind the energy of the creative person and determine whether he will be active and perhaps productive. General motives, such as the need for achievement, the need for expression, and the need for producing order are important in supporting creative endeavour. The results of the present study also support the statement that the high creatives are more achievement-motivated than the low creatives.

Since this study utilized Class IX students exclusively, a subsequent investigation may be concerned with a study of creative functioning in relation to intellectual style, field independence and dependence and risk-taking, using a larger number of subjects from the field of science.

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Self-confidence and Social Intelligence

A Correlational Study

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MANY theorists have utilized the notion of self-concept to conceptualize behaviour in terms of a single, unified construct. James (1890) made forceful attempts to emphasize the importance of self in psychology. In his paper "The ego in contemporary psychology," Allport (1943) stimulated

the interest of personality theorists in their direction. Rogers (1947) presented a theory of organization of personality in terms of self-concept. The self-concept or phenomenal self, as it is sometimes called in contemporary psychology, refers to the individual's perception of himself.

In the recent past there have been attempts to derive several other useful constructs from self theory—one such derivative of self-concept is self-confidence. Self-confidence as a dimension of personality has been the subject-matter of a few studies in the past (Klein and Schoenfield, 1941; Block and Patterson, 1955; Rychalk, 1959; Mullins, 1963). Basavanna (1971) conceived of self-confidence as an attribute of self-concept and investigated the characteristics of persons with varying degrees of self-confidence. He has indicated positive relationship between self-confidence and social intelligence.

Self-confidence is another derivative of self-concept. According to some self-oriented theorists (Rogers, 1951, 1954; Allport, 1961; Combs and Snygg, 1959; Symonds, 1951), a self-confident person was defined as one who perceived himself as socially competent, emotionally mature, generally capable, successful, satisfied, decisive, optimistic, independent, self-reliant, self-assured, forward moving, fairly assertive, having leadership qualities, and as having positive and constructive self-feeling and evaluation. In general, self-confidence refers to an individual's ability to act effectively in a situation to overcome obstacles and to get things to go alright.

Social intelligence has been defined as an activity to get along with others, to get work done from others, social awareness or sensitivity and more than all these essential characteristics, self-confidence (Moss, *et al.*, 1955, Manual of Social Intelligence Test). It emphasizes, as a major aspect, the ability to deal effectively with people and carry on sound social relationship. They have also a good appraisal of their abilities. This development of better self-understanding furnishes them with high self-confidence which is essential in dealing effectively with other people. Self-confidence score, therefore, can be taken as a scientific measure of self-acceptance.

As social intelligence and self-confidence involve self-acceptance, the investigator proposed to find the relationship between these two independent variables. The following hypotheses have been tentatively formulated relevant to the problem under investigation. In this investigation, social intelligence is assessed by using George Washington University Social Intelligence Test and Self-confidence Inventory (s-c) adopted by Basavanna (1971).

1. There will be positive and significant correlation between social

- intelligence and self-confidence scores. Both variables imply the common factor, viz. self-confidence and hence positive and significant correlation is predicted.
2. Significant difference between the means of self-confidence (sc) score would be present between high social intelligence group (HSI) and low social intelligence group (LSI). In other words, higher the social intelligence score, greater the self-confidence score and *vice-versa*.
 3. Significant difference between the means of social intelligence (SI) score would be present between high self-confidence group (HSC) and low self-confidence group (LSC), i.e. The higher the self-confidence score the greater the social intelligence score and *vice-versa*. This is the reversal of the previous hypothesis (Hypothesis 2). It further confirms the findings in the previous hypothesis.

METHOD

Subjects

Fifty male students and fifty female students of both Sri Venkateswara University College and Sri Padmavathi College, Tirupati were selected as *Ss* in this study. The subjects were postgraduate students from Sri Venkateswara University College and graduate students of various classes in Sri Padmavathi women's college. All students were residing in hostels and their age ranged from 18 to 23 years. The sample consisted of both arts and science students.

TESTS

Self-confidence Inventory

Self-confidence inventory developed by Basavanna (1971) was administered to the sample to obtain a measure of self-confidence. This inventory consists of 100 self-referent statements. Each statement has to be answered either as true or false. This instrument has been standardized over a large group of university students. The items were selected after careful cross-validation. A split-half reliability of 0.94 has been reported by the author. Instructions for the administration of the inventory are simple and are printed in the test-booklet itself. There is no time limit and most of the students could complete this test within 30 minutes. The score

of an individual is equal to the number of responses scored. According the scoring procedure a high score indicates lack of self-confidence and *vice-versa*.

Social Intelligence Test

The measure of social intelligence was obtained by employing the procedures developed by Moss, *et. al* It is obtained by using the revised form (second edition) of the social intelligence test developed by Moss, *et. al*. This form contains four parts : (i) Judgment in social situations, (ii) recognition of the mental state of the speaker, (iii) memory for names and faces, and (iv) observation of human behaviour. The test was conducted following the direction given in the manual. A time-limit of 45 minutes was imposed on the students for completing this test. Scoring was made based on the procedure given in the manual. The maximum score for all the five tests was 160. Percentile norms are available in the manual which can be noted based on the score obtained in the social intelligence test.

Each *S* was tested by the investigator in two sessions. In the first session the self-confidence inventory was administered to groups consisting of not more than six *Ss*. The *Ss* were explained the purpose of this investigation before testing to enlist cooperation and active participation in the testing programme.

Analysis of Results

The definition of social intelligence emphasizes high self-confidence and self-appraisal which is essential in dealing effectively with other people. Adequate self-adjustment is essential for individuals to develop self-confidence. Social intelligence and self-acceptance is closely related and hence it was predicted that there would be positive correlation between social intelligence test and self-confidence. The product-moment correlation has been computed to determine the correlation.

The *Ss* were classified into high self-confidence group (HSC) and low self-confidence group (LSC). From the scores obtained in the Self-confidence Inventory (SCI), the mean and the Standard Deviation (SD) were calculated. Those whose scores were more than mean + .5 SD were grouped under HSC group and those whose scores were less than mean - 0.5 SD were grouped under LSC. HSC group consisted of 20 *Ss* and LSC group consisted of 20 *Ss*. The Social Intelligence scores obtained by HSC and LSC groups

were noted and significance of differences (of Social Intelligence Test) between means of these two extreme groups were statistically analysed.

Based on the scores obtained in the Social Intelligence Test extreme groups were selected, the two groups being those who scored high in Social Intelligence Test (HSI) and those who scored low in Social Intelligence Test (LSI). The mean and standard deviation were calculated for the entire group of students. Those *Ss* whose scores were more than mean + 0.5 SD were grouped under HSI group while those *Ss* whose scores were less than mean - 0.5 SD were grouped under LSI group. HSI group consisted of 20 *Ss* and LSI group consisted of 20 *Ss*. The self-confidence scores obtained by the LSI and HSI groups were noted and significance (of self-confidence scores) between the means of these two extreme groups were statistically analysed.

Results and Discussion

The scores of Social Intelligence Test have been classified into class intervals and their frequencies noted. Similarly, scores of self-confidence inventory have been classified into class intervals and their frequencies noted. The data have been fit into scatter diagram noting their frequencies. The product-moment correlation has been computed and the following Table gives certain relevant scores and *r* between social intelligence and self-confidence inventory.

Table 1
CORRELATION BETWEEN SELF-CONFIDENCE AND
SOCIAL INTELLIGENCE

$\Sigma X'Y' = -1058$	$C_X = 0.02$
$N = 100$	$C_Y = 0.95$
$\sigma_X = 3.41$	$\sigma_Y = 4.09$
$\frac{\Sigma X'Y'}{N} = \frac{-1058}{100} = -10.58$	$-(0.02 \times 0.95)$
$r = \frac{\sigma_X \times \sigma_Y}{10.60} = \frac{3.41 \times 4.09}{13.95} = -0.76$	

Though *r*-value is -0.76, it should be interpreted as positive and significant. Details regarding this interpretation could be explained in the following

manner. Social Intelligence Test yields higher social intelligence score for those who possess high social intelligence whereas low score in this test indicates lower level of social intelligence. In the self-confidence inventory (sci) higher the score lower the self-confidence and lower the score higher the self-confidence score. But scores were taken as such in product-moment method which has resulted in negative correlation. Therefore negative correlation obtained for data in Table 1 has to be understood in the context referred above and should be interpreted that there is high and significant correlation between self-confidence inventory and social intelligence test.

The theoretical expectation that there should be high correspondence between self-confidence and social intelligence test is borne out from the results in Table 1 fully supporting hypothesis 1.

The extreme groups in self-confidence test have been selected. For these two extreme groups designated as high self-confidence group (HSC) and low self-confidence group (LSC) mean social intelligence scores have been computed and their mean difference and significance analysed. The following Table gives the mean social intelligence scores of these two HSC and LSC groups.

Table 2
DIFFERENCE BETWEEN HIGH SELF-CONFIDENCE AND LOW
SELF-CONFIDENCE GROUPS WITH RESPECT TO SOCIAL
INTELLIGENCE SCORE

<i>Group</i>	<i>Mean</i>	<i>S.D.</i>	<i>D</i>	<i>d</i>	<i>Significance</i>
High Self-confidence	113.9	30.39			
Low Self-confidence	56.5	16.15	57.4	7.6	7.55**

**Significant at 0.01 level

The HSC group gets 113.9 while LSC group gets 56.5 as Social Intelligence score denoting the superiority of HSC group over LSC. The difference between these groups, viz, 57.4 have been found to be significant at .01 level with a CR value of 7.55. Therefore hypothesis 2 that there will be significant difference between high self-confidence group and low self-confidence group has been confirmed as observed in the results obtained in Table 2.

In order to confirm further the theoretical expectation the reversal of hypothesis 2 has been formulated as the third hypothesis. Hence the sample was divided as extreme groups based on Social Intelligence score and designated as High Social Intelligence group and Low Social Intelligence

group (LSI) and the mean self-confidence scores obtained. The data given in the following Table pertains to the self-confidence scores obtained by these extreme groups HSI and LSI.

Table 3
DIFFERENCE BETWEEN HIGH SOCIAL INTELLIGENCE AND LOW
SOCIAL INTELLIGENCE GROUPS WITH RESPECT TO
SELF-CONFIDENCE SCORE

Group	Mean	S.D.	D	d	Significance
High social intelligence group	7.80	5.43			
Low social intelligence group	38.35	13.35	30.55	3.32	9.2**

**Significant at .01 level

The mean self-confidence score of HSI is 7.8 while the mean self-confidence score of LSI is 38.5. These scores indicate that HSI is superior in self-confidence (Lower the score higher the self-confidence) compared to LSI which gets 38.35. The difference between the mean self-confidence scores is 30.55 and is significant at .01 level with a CR value of 9.2. Hence it is noted that there is significant difference between the high social intelligence group and low social intelligence group with respect to self-confidence scores. Therefore, hypothesis 3 is fully supported and confirmed as revealed from the results obtained in Table 3.

An analysis of the results clearly indicate that Social Intelligence and Self-Confidence involve self-acceptance and that there is relationship between these two variables. The investigation reported above has brought forth the following conclusions :

1. There is a positive and significant relationship shown by the correlation between Self-Confidence and Social Intelligence.
2. Significant difference between the means of self-confidence score is present between High Social Intelligence group (HSI) and Low Social Intelligence group (LSI).
3. Significant difference between the means of social intelligence score is present between High Self-Confidence group (HSC) and low Self-Confidence group (LSC).

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A Diagnostic Test in Chemistry

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INTRODUCTION

As a student of education the investigator did not come across tools in the field of chemistry which would help her to locate the errors pupils commit due to which the understanding of the subject is affected. Therefore, it was felt to do some investigation in that area which would be helpful to the teachers of chemistry. The investigator makes an effort to prepare a

* Ross, C.C., *Measurement in Today's School*, Prentice-Hall, Inc., New York

reliable tool that could be used by teachers before teaching is done. Such a tool will be a diagnostic test in chemistry.

Since quite a large percentage of pupils in intermediate and B. Sc. fail in chemistry (as is known by the analysis of intermediate and B.Sc results) it becomes our pious duty as teachers of chemistry to do some effort to save this wastage. It can only be done if exact reasons of failure is revealed by the tool—the diagnostic test.

Diagnostic tests are the achievement tests constructed to discover the deficiencies in the pupils' achievements. These tests are intended to measure the constituents of skills involved in a subject-matter area. They help to understand particular weaknesses in the school achievement.

PURPOSE

1. Correct estimation of students' weaknesses.
2. Diagnostic findings would be aids to teaching.
3. Diagnostic testing help reading the minds of the students.
4. Suggest plan remediation.

OBJECTIVES

1. To construct a diagnostic test of chemistry.
2. To ascertain the reliability and validity of the test.
3. To analyse the errors with their frequencies committed by the students.
4. To categorize the errors.
5. To find out causes of the errors.

DELIMITATIONS

1. In sampling the subject population, it was limited to students of intermediate science of Agra city.
2. In selecting the sample of behaviours for diagnosis, only five topics from chemistry were selected.
3. In the development of proper tool, only one type of test—the diagnostic test—was prepared.

PROCEDURE

For construction of a diagnostic test, topics were selected on the basis

of the following tools :

1. Achievement test
2. Examination scripts
3. Teachers' report

These three tools were compared and on that basis the following five topics were selected for the construction of the test^a :

1. Structure of atom
2. Electrolysis
3. Chemical reactions and equations
4. Hydrocarbons
5. Alcohols

SAMPLE

This study was conducted on a sample of 400 (200 boys and girls) pupils randomly selected from six intermediate colleges of Agra district who had offered chemistry as one of the subjects.

Scoring of the Test

In the diagnostic test negative scoring was done because the objective is to know the nature of errors pupils commit in the field of chemistry.

Reliability^b

The split-half reliability of the diagnostic test was ascertained. The reliability of the test comes to be 0.83.

Validity of the Test^c

The evidence of validity of a diagnostic test is the content validity of

^aGupta, R. and Rawat, M.S., 'Construction and Standardization of Diagnostic Test in Chemistry', M.Ed. dissertation, R.B.S. College of Education, Agra, 1973

^bGarret, H.B., *Statistics in Psychology and Education*, New York, Longmans Green & Co., 1926

^cAnastasi, A., *Psychological Testing*, New York, The Macmillan & Co., 1959

the test. The contents of the diagnostic test are the errors or the difficulties which the students are supposed to make in the test. The area of errors as pooled up from these different sources built up the total content to be located from the students' response of the diagnostic test.

Nature of Errors	Answers
Examples	
1. Point out which is correct :	
An atom is :	(a) Indivisible, (b) has independent existance, (c) takes part in chemical reaction.
2. Fill in the blanks*	
In an electrolyte the reaction takes place between	
-----, (a) molecules, (b) atoms, (c) solution.	
3. Balance the following chemical equation :	
CuS + HNO ₃ ----- Cu(NO ₃) ₂ + S + H ₂ O + NO 2CuS + HNO ₃ ----- 2Cu(NO ₃) ₂ + S + H ₂ O + 2NO	
4. Find out the valency of Cu in Cu ₂ O. (a) two, (b) three.	
valency of Ba in BaSO ₄ (a) one, (b) three, (c) four.	
5. Select the saturated and unsaturated hydrocarbons from the following :	
Methane	Saturated
Propylene	Propylene
Acetylene	Acetylene
Butylene	Butylene
Isobutane	Unsaturated Methane Isobutane

CAUSES OF THE ERRORS

After the errors were known, causes have been assigned to these :

1. In recalling the names of the inventors, the student miscalls the names of the persons who were somehow associated with the work differently.
2. The students are not conversant with the modern development of the theory, only the old facts strikes their mind in selecting the correct answer. For example, atom is a divisible particle but they recall only Dalton's atomic theory.
3. The concepts are not clear, they cannot discriminate between two closely related concepts such as dissociation and electrolysis.
4. Errors of translation are ample, structural and empirical formulas for them are not different. Alcohol, aldehyde and acids are not discriminated.
5. They are not clear about reactions, what does reaction really mean

- and what are the contents of a chemical reaction.
- 6. Substitution, addition and double decomposition, etc. are not comprehended. This shows that they are not clear about the process of reactions.
- 7. Information about the correct subject-matter is poor.
- 8. The structure of atom and the placement of electrons in different orbits is not clear.
- 9. About balancing of equations, the students misunderstand atomic number, valency and atomic weight.
- 10. In applying the knowledge in different situations, students fail to apply proper formula, proper principal and they do not know the method of applying it.

After analysing the causes the researcher stepped ahead to categorise the errors. The following categories were unanimously arrived at :

1. Lack of knowledge : (a) the facts and meaning of concepts, (b) processes, and (c) new information
2. Errors of translation
3. Errors in balancing the equations
4. Lack of identification
5. Errors in discrimination
6. Errors in comprehending two closely related concepts.
7. Errors in Application : (a) proper formula, (b) proper principal, and (c) proper processes.
8. Errors of computation

The categorization of errors is quite comprehensive which relates to three types of objectives which a learning programme caters for, that is, development of knowledge, comprehension and application. Other aspects were neither touched through the test nor categorized from the errors.

SUGGESTIONS

Any diagnosing is meaningless if it is not followed by proper remedial measures. Pupils should be supplied with extra reading material in the form of programme learning material and newer textbooks which provide ample illustrations and learning materials on these topics.

EDUCATIONAL IMPLICATIONS

1. The diagnostic test is useful in locating the difficulties, weaknesses

- and errors of students.
2. It is an important tool in finding out the causes of errors committed by the students.
 3. It is also useful in understanding particular weaknesses in the school achievement.
 4. Remedial measures could easily be undertaken for proper understanding of the subject by the pupils.

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Effects of Training in Interaction Analysis on Verbal Behaviour of Student-Teachers

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INTRODUCTION

RECENT researchers and educational thinkers have started thinking about teaching scientifically. Flanders (1970) states: "Teaching behavior by its very nature, exists in a context of social interaction. The acts of teaching

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lead to reciprocal contacts between the teacher and the pupils, and the interchange itself is called teaching". McDonald (1971) observes: "Teaching, one aspect of education, is an interaction between a teacher, a person who can induce intelligent behaving and a learner, a person who is acquiring intelligent behavior ...". Attempts are being made in developed countries to describe, discuss, and analyse teaching behaviour. Hough and Cuncan (1970) say:

Teaching as a rational human endeavor can be described, discussed and analysed and this can be done whether that description, discussion or analysis be abstract or related to a particular act of teaching that has occurred or is occurring in the lives of a teacher and his students.

Thus teaching as an observable interactive process has opened the door for innovations in the teacher-education programme. Medley and Mitzel (1963) observe: "Certainly there is no more obvious approach to research on teaching than direct observation of the behavior of teachers while they teach and pupils while they learn". Thus the observational techniques may help in innovations in teacher-education programmes and research on teaching. Flanders (1970) reports: "Four techniques—T-groups, simulated skill training, interaction analysis, and microteaching have singly or in some combination, provided innovations for pre-service and in-service program in education". In the Indian situation, however, much has to be done in this regard.

PURPOSE

The purpose of the present study was to test the following hypotheses in order to see the effects of training in interaction analysis on verbal behaviour of student-teachers.

1. There is no significant difference in the use of different categories (in this case Flanders' interaction analysis categories) by student-teachers trained in interaction analysis and those not so trained.
2. There is no significant difference in teacher-initiated talk of student-teachers trained in interaction analysis and those not so trained.
3. There is no significant difference in the teacher-response of student-teachers trained in interaction analysis and those not so trained.
4. There is no significant difference in pupil-response with student-teachers trained in interaction analysis and those not so trained.

5. There is no significant difference in pupil-initiation with student-teachers trained in interaction analysis and those not so trained.
6. There is no significant difference in the amount of silence or confusion between classes taught by student-teachers trained in interaction analysis and those not so trained.
7. There is no significant difference between i/d ratio of student-teachers trained in interaction analysis and those not so trained.
8. There is no significant difference between revised i/d ratio of student-teachers trained in interaction analysis and those not so trained.

PROCEDURE

Sample

The present study is based on student-teachers studying B.Ed. course during the session 1976-77 in two colleges of education under the Patna University. The entrants to these colleges come from all over the state of Bihar. The minimum academic requirements for admission to this course is a Bachelor's degree in arts/science/commerce. The study is based on a random sample of 50 student-teachers drawn from the population of 623 student-teachers. Twenty-five subjects from each constituted the control group and the experimental group.

Treatment

The control group followed the normal programme of the college regarding teaching practice. They followed the Herbertian pattern of lesson-planning. After the demonstration lesson and a criticism lesson from each of the subjects they were asked to give twenty practice lessons. They were supervised on the traditional style. The experimental group in conjunction with the regular theory course was taught Flanders' system of interaction analysis. After the demonstration lesson by one of the investigators and a criticism lesson from each of the subjects, they were trained in the process of coding and decoding of Flanders' ten categories. They were then asked to give twenty practice lessons. The investigator spent the whole working period with the experimental subjects in supervising and assisting them in using different categories. Another feature of the supervision was that the investigator taped the classroom discourse for ten minutes and later discussed the pattern individually with the teacher.

concerned. Two separate schools were used by the control and the experimental groups. Another care taken was that two groups were from two different colleges of education under the Patna University.

Collection of Data

The lessons were taped in the middle of the session for twenty minutes. Final taping of lessons could be possible for 20 subjects in the experimental group and 22 subjects in the control group. Thus, in order to have equal number of subjects, two cases from the control group were randomly dropped.

The investigators completed the coding work with an interval of three seconds for each category. However, it was decided to have 400 tallies at the minimum as suggested by Flanders (1970). The average time covered in having 400 tallies was between 18 and 20 minutes. For the purpose of analysis of the data 40 matrices were prepared, one each for all the 40 subjects. The t-test was applied to study the significance of difference in respect of each of the hypotheses.

RESULTS AND DISCUSSION

Table 1 shows the comparison of 20 non-interaction analysis group of student-teachers and 20 interaction analysis group of student-teachers on ten Flanders' Interaction analysis categories.

On the basis of t-ratios as seen in Table 1, the null hypothesis of no difference in use of categories 2,3,4,5,6,7,9 and 10 is rejected while the same in the cases of categories 1 and 8 is not rejected. Thus it is evident that the interaction analysis group showed a change in the verbal behaviour. The experimental group used more praises or encouragements, accepted more pupil ideas, put less questions and thus allowed more time for pupil-talk—response and initiation—took less time in lecturing, gave less directions and witnessed less silence or confusion. There was no statistical evidence to show significant difference between the control group and the experimental group in respect of acceptance of feelings and pupil response, but the mean values of experimental group are greater than those of control group in respect of both the categories.

Table 2 shows the comparison of the non-interaction analysis group of student teachers and the interaction analysis group of student-teachers in respect of teacher-initiated talk (TIT), teacher-response (TR), pupil-response (PR), pupil-initiation (PI), and silence or confusion (S/C).

Table 1
COMPARISON OF NON-INTERACTION AND INTERACTION
ANALYSIS GROUPS

Category of Verbal Behaviour	Non-Interaction Analysis Group N = 20		Interaction Analysis Group N = 20		t	p*
	MEAN	SD	MEAN	SD		
1.	.10	.20	.16	.46	— .56	N.S.
2.	3.06	3.18	10.15	3.71	— 6.40	.01
3.	4.76	1.97	17.01	6.43	— 8.17	.01
4.	23.20	4.35	9.99	3.29	10.83	.01
5.	23.04	8.28	13.23	4.34	4.69	.01
6.	3.26	1.92	1.14	1.16	4.24	.01
7.	3.28	2.29	1.60	1.14	2.95	.01
8.	23.71	5.10	26.13	7.13	— 1.23	N.S.
9.	2.98	2.80	12.39	4.54	— 7.91	.01
10.	12.60	4.41	8.10	3.31	3.66	.01

*t-table used with 39 d.f.

Table 2
COMPARISON OF NON-INTERACTION AND INTERACTION ANALYSIS
GROUPS ON TIT, TR, PR, PI AND S/C

Variables	Non-Interaction Analysis Group N = 20		Interaction Analysis Group N = 20		t	p*
	MEAN	SD	MEAN	SD		
Teacher-initiated talk (TIT)	29.59	8.50	16.50	5.46	5.78	.01
Teacher-response (TR)	7.94	3.44	26.83	8.01	— 9.69	.01
Pupil-response (PR)	23.71	5.10	26.13	7.13	— 1.23	N.S.
Pupil-initiation (PI)	2.98	2.80	12.39	4.54	— 7.91	.01
Silence or Confu- sion (S/C)	12.60	4.41	8.10	3.31	3.31	.01

*t-table used with 39 d.f.

The t-value obtained in respect of teacher-initiated talk, teacher response, pupil-initiation and silence or confusion suggest to reject the respective hypotheses. However, the hypothesis in respect of pupil-response is not rejected. Thus the interaction analysis group showed significant change in verbal behaviour related to teacher initiation and teacher response. They also witnessed significant pupil-initiation and significantly less silence or confusion. However, pupil-response did not differ significantly.

Table 3 shows the comparison of the non-interaction analysis group of student-teachers and the interaction-analysis group of student-teachers in respect of i/d ratio and revised i/d ratio.

Table 3
COMPARISON OF NON-INTERACTION AND INTERACTION ANALYSIS
GROUPS ON I/D RATIO AND REVISED I/D RATIO

<i>Variables</i>	<i>Non-Interaction Analysis Group (N = 20)</i>		<i>Interaction Analysis Group (N = 20)</i>		<i>t</i>	<i>p*</i>
	MEAN	SD	MEAN	SD		
i/d	1.12	.49	2.60	1.14	1.68	E.S.
Revised i/d ratio	1.43	1.03	14.93	10.80	5.14	.01

*t-table used with 39 d.f.

The t-value obtained leads to non-rejection of hypothesis in respect of i/d ratio. However, this may be inferred that the interaction-analysis group appeared to be more indirect, though not significantly, than the non-interaction analysis group. The hypothesis in respect of revised i/d ratio is rejected and thus it is evident that interaction analysis group fared significantly better in providing emphasis to motivation and control in the classroom than the non-interaction analysis group.

CONCLUSIONS

The findings of the present study indicate a clear trend with respect to differences in the types of verbal behaviour used by student-teachers trained in interaction analysis. The interaction-analysis group (*i*) used more

praise and encouragement, (ii) did less lecturing, (iii) used less extended direct talk, (iv) gave fewer directions, (v) did less teacher-initiated talk, (vi) used more teacher-response, (vii) enthused more pupil initiation, and (viii) laid more emphasis on motivation and control in the classroom.

The system may provide the teacher a feedback mechanism to enable him to become more sensitive to his own teaching behaviour. It may also prove useful in the hands of the student teaching supervisors and evaluators of student teaching. The findings of this study, however, suggest further investigation into the effects of training in interaction analysis on the achievement of pupils in Indian classrooms which are comparatively crowded.

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Development of the Concept of Time in Children

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INTRODUCTION

THE concept of time is of little importance to children, though it means much to adults. Initially an infant's sense of time is concrete, being related to his own routines, viz. eating, sleeping, getting up, etc. It is the parents who first fix up the time of getting up, going to bed, meals, play-time and other works (Crow and Crow, 1962).

Time estimation is none too accurate in adults, but is even worse in children. This explains the apparent disobedience of children when they fail to come back home after play or at any appointed time. For them, time seems to pass quickly when they are active or interested in play, but slowly when they are idle.

Concepts of time develop very slowly because they are abstract and involve subjective appreciation and more reasoning than the young child is capable of. The child may understand numbers on a clock or the time of specific daily occurrence but the understanding of dates in historical time, of the word 'generation' and of chronological order is beyond him. The child first learns those time concepts which have a personal reference and later those which are more remote from his experience (Cohen, *et al.*, 1954).

Understanding the meaning of time depends upon the use of cues, e.g. the time of meals or other regular activities. If the daily routine is haphazard, children will find it difficult to develop time concepts. Because young children do not have a crowded schedule and most of their time is free for play, they have very few cues to aid the development of their concepts (Russell, 1953).

Many time concepts, especially those relating to conventional time, are dependent upon the growth of the number concepts. A child cannot understand completely the meaning of 'month' until he has a correct concept of 30 or 31 and its relationship to seven days (Hurlock, 1964).

*Paper based on the report of a study financed by NCERT

The perception of time of the day, day of the week or season of the year is more accurate because the specific activities associated with those periods act as a cue. The day is distinguished from the night because the former is lighted and the latter dark and because day is the time when the child can be up and the night is the time when he must be asleep. Morning is perceived as different from afternoon because morning is play-time and afternoon is nap-time, the days of the week are likewise known through the activities associated with them. Sundays are usually known first because the father is at home and the routine of the day is often interrupted for family trips (Russell, 1953).

CONCEPTS OF DURATION OF TIME

The ability to estimate time intervals correctly develops only after the child has learnt to relate time to different activities. The young child has no ideas of length of time, he usually judges it in terms of what he is doing. According to Fraisse (1963), young children cannot estimate duration in temporal units and have no idea of what a minute or an hour represents. They only learn to use those units with some degree of accuracy after years of experience. According to Piaget (1969), children estimate duration primarily in accordance with the amount of work accomplished and only at a later stage by the quality of activity felt.

In learning to tell time by the clock, all children follow a similar genetic sequence. They can first tell time and set the clock by the hour, then by the half hour and later by the quarter hour. They much learn the meaning of the difference in the length of the hands, however, before they can do either. Most children learn to tell time when they are six years old (Springer, 1952).

METHOD

An interview schedule was prepared under the sub-heads : (a) concerning self, (b) concerning parents, (c) notion of time by clock, (d) concerning peers, and (e) historical time. There were 25 items for each of (a) and (b), 30 items for (c) and 20 items for (d). This schedule was presented to a group of experts consisting of ten individuals who were required to say : (i) the appropriateness of each item in respect to the sub-head; (ii) the ambiguity of the item or items; (iii) any other matter relating to the relevance of the items.

The items having more than 50 per cent agreement were sorted out

and arranged according to the sub-heads mentioned above. After discarding some of the items, the selection consisted of 20 items, each for (a) and (b), 28 items for (c) and 15 items each for (d) and (e). This schedule was then presented individually to 70 children (35 boys and 35 girls) of four schools. Their age levels ranged from 4 to 10 years and the population was drawn from kindergarten to Class V. This phase constituted the pre-pilot study of the project. The analysis of the data necessitated the elimination of two sub-heads, viz. (d) concerning peers and (e) concerning historical time, as very few children in the population could record any responsive notion.

The next phase consisted of arranging the items as per the above findings under the sub-heads : (a) concerning self (CS), (b) concerning parents (CP), and (c) notion of time by clock (NTC). For each of the sub-heads CS and CP categories were made again as (i) general, (ii) specific, (iii) duration, (iv) discrimination between two events and (v) comparative judgment between two events. For each category of CS and CP three questions or statements, i.e. 15 items each for CS and CP, were prepared. For NTC 25 questions or statements were prepared having five questions each under the following five categories :

- (i) Notion regarding the concept of day and night, today, yesterday and tomorrow, morning and afternoon.
- (ii) Ability to read the clock.
- (iii) Notion regarding the concept of week, month and year.
- (iv) Notion regarding the concept of season, i.e. summer, winter, etc.
- (v) Comparative judgment between two items/times.

This schedule containing the different items of CS, CP and NTC was presented individually to 120 children of six chronological age levels having 10 boys and 10 girls in each group. The responses collected from these groups were analysed and certain items revealing no response or incomplete answer or found otherwise incompatible were dropped. This part comprised the pilot study phase from which the final selection of questions or statements under each category of CS, CP and NTC was made. There were thus 10 questions each for CS and CP and 20 for NTC for the final study.

The final study was made on 240 children drawn from eight different schools. The composition of the sample is shown in Table 1. A task-oriented measurement of time was undertaken to have an insight into the nature of estimation children make. This part of the study was limited to those children who were familiar with English alphabet, i.e. the upper-grade children of the sample. Each child was given a typed sheet containing 200 words and was instructed to cancel the vowel *a* and was later required to say the time in minute/s or second/s spent in cancellation

Table 1
COMPOSITION OF SAMPLE

S.No.	Name of the School	No. of Students	Total
1.	Hare School	30	
2.	St. Paul's High School	30	
3.	Singhes Bagan High School	30	120
4.	Children's Happy Home	30	
5.	Bethune School	30	
6.	St. Margarette School	30	
7.	Holy Child Institute	30	120
8.	Calcutta Children's School	30	

Table 2
CONCERNING SELF

Grade :		I	II	III	IV	V	VI
Age Level :		4-5 yr.	5-6 yr.	6-7 yr.	7-8 yr.	8-9 yr.	9-10 yr.
Item	Sex						
1	B	60	75	75	90	100	100
	G	85	85	85	100	100	100
2	B	30	55	35	95	90	90
	G	25	40	40	55	95	100
3	B	20	35	60	60	80	85
	G	25	30	40	60	90	90
4	B	50	60	65	65	85	90
	G	45	60	65	90	90	100
5	B	0	20	25	40	75	85
	G	10	15	20	55	80	85
6	B	5	15	45	65	85	90
	G	10	15	34	45	65	85
7	B	25	30	35	65	85	90
	G	0	45	45	55	75	95
8	B	0	0	0	20	70	75
	G	0	5	10	35	65	55
9	B	0	0	0	15	50	55
	G	0	0	0	0	35	55
10	B	0	0	5	15	55	60
	G	0	0	0	20	50	65

All Tables show correct responses of the boys and girls in percentage in different age-groups.

B=Boys ; G=Girls

Table 3
CONCERNING PARENTS

Grade : Age Level :		I 4-5 yr.	II 5-6 yr.	III 6-7 yr.	IV 7-8 yr.	V 8-9 yr.	VI 9-10 yr.
Item	Sex						
1	B	40	85	85	85	90	95
	G	85	90	90	100	100	100
2	B	45	65	75	95	100	100
	G	85	85	90	90	95	100
3	B	15	45	80	85	90	95
	G	15	50	55	90	95	95
4	B	50	55	60	70	85	85
	G	35	45	45	80	85	100
5	B	0	10	45	45	55	90
	G	5	20	30	75	75	80
6	B	0	15	25	65	65	95
	G	10	25	30	60	70	75
7	B	5	15	35	55	85	85
	G	10	20	30	65	85	90
8	B	5	10	30	65	80	90
	G	0	5	15	70	75	90
9	B	0	5	10	25	55	65
	G	0	0	5	30	35	85
10	B	0	0	10	40	70	75
	G	0	0	5	25	70	75

when the task was over. The experimenter, however, noted the actual time spent by the child in the task. Thus the difference between the actual time (as noted by the experimenter) and the apparent time (as estimated by the child) shows the nature of estimation, i.e. over-estimation or under estimation.

RESULTS

Each statement or question was scored in terms of right or wrong answer. The correct response was given '1' and the wrong response '0'

Table 4

NOTION OF TIME BY CLOCK

Grade : Age Level :		I 4-5 yr.	II 5-6 yr.	III 6-7 yr.	IV 7-8 yr.	V 8-9 yr.	VI 9-10 yr.
Item	Sex						
1	B	55	75	95	100	100	100
	G	80	100	100	100	100	100
2	B	40	55	90	90	100	100
	G	20	75	75	95	100	100
3	B	10	55	65	65	95	100
	G	5	25	45	85	100	100
4	B	35	85	85	100	100	100
	G	70	80	75	95	100	100
5	B	10	15	35	35	80	85
	G	0	20	20	60	80	80
6	B	0	0	5	40	50	85
	G	0	5	10	40	75	100
7	B	0	0	10	20	60	95
	G	0	5	15	40	75	95
8	B	0	0	0	25	45	75
	G	0	0	10	50	75	90
9	B	0	0	10	45	75	95
	G	0	0	10	55	85	100
10	B	15	60	70	70	90	95
	G	20	40	70	90	95	95
11	B	10	20	30	80	95	100
	G	5	25	35	40	85	85
12	B	10	25	70	75	100	100
	G	5	45	50	85	100	100
13	B	0	5	35	45	85	95
	G	0	5	5	20	90	100
14	B	0	10	20	45	75	90
	G	0	15	20	35	60	100
15	B	0	0	0	15	35	45
	G	0	0	0	5	30	35
16	B	0	10	30	40	85	90
	G	0	20	20	35	85	85
17	B	0	0	25	25	55	60
	G	0	10	10	40	75	85
18	B	0	10	15	15	50	55
	G	0	0	5	15	50	75
19	B	0	20	40	45	65	65
	G	5	20	20	60	75	75
20	B	0	0	0	5	20	50
	G	0	0	0	0	30	55

Table 5
TIME IN SECONDS IN TASK-ORIENTED TIME ESTIMATION

Grade : Age Level :		I 4-5 yr.	II 5-6 yr.	III 6-7 yr.	IV 7-8 yr.	V 8-9 yr.	VI 9-10 yr.
Item	Sex						
Contain- ing a sheet of 200 words		12591.1	1772 sec.	14435.29	214.66	338.8	255.789
	Boys	sec. N=9		sec. N=17	sec. N=15	sec. N=17	sec. N=19
	Girls	5450 sec. N=6	1996.6 sec. N=9	960 sec. N=16	205.26 sec. N=19	369 sec. N=20	328.235 sec. N=17

('zero'). The basic datum for each child for each age and sex group, therefore, consisted of counting the responses in respect of different items for the three aspects, viz. CS, CP and NTC. For further analysis, the percentages of right answers for the particular age and sex group were tabulated (Tables 2, 3 and 4). Table 5 shows the significance of difference in the task-oriented time estimation in different age-groups.

DISCUSSION

Concerning Self (CS)

The analysis of data indicate an excellence in performance of girls over boys in general, though boys are slightly better off in temporal notion as to 'duration', 'discrimination' and 'comparative judgment'. In all these items response is significant only around the age level of 7-8 years. The 'general' and 'specific' items concerning self reveal development of some notion regarding time in both sexes in so far as these aspects are personally involved whereas 'duration' falls far short of the desirable range of temporal estimation in either sex below the age of seven years. Temporal 'discrimination' and 'comparative judgment' depend upon higher mental processes and develop slowly; both boys and girls evidently failed to estimate these two temporal units at their age levels below 7-8 years. It shows, therefore, that the actual development of the time concept is transitionally bound at the age level of 7-8 years. Observation here definitely counts a clear difficulty in estimation of time in 50 per cent of children in either sex within the age-group of seven years and below. The development, however, is rapid after the age of seven years and 'comparative judgment' in terms of

personal activities is good around the age level of 10 years, when temporal estimation is reasonably comparable to that of adults.

Concerning Parents (CP)

The notion of time concerning parents is not much deviated from that concerning self. There is a steady development of the time concept concerning parents in either sex against items of 'general', 'specific' and 'duration' aspects. Development is significant for 'general' and 'specific' items at the age level of 5-6 years, while that for 'duration' and 'discrimination' is significant only at the age level of 7-8 years. Of the two sexes, both excell in performance in both these aspects. True notion of time regarding 'comparative judgment' is delayed in development till the age of 8-9 years in either sex.

Concerning Notion of Time by Clock (NTC)

As revealed by the findings, children are able to distinguish 'day' from 'night' by the age of five years, whereas ability to 'read the clock', which depends upon numerical (mathematical) concept, is absolutely poor in children below the age-group of 6-7 years. Observation indicates a gradual development of temporal concept of 'today', 'yesterday' and 'tomorrow', reaching a perfection in estimation by the age level of 9-10 years. Of the two sexes, girls are better in responses against these items as compared to their counterparts in age. Accurate responses are noted in both the sexes in respect of items like 'day', 'day of the week', 'month' and 'season of the year' only after the age level of 7-8 years. These items are generally conditioned with specific tasks associated to personal involvement acting as cues. Below the age level of 10 years both the sexes fail to achieve a true notion of temporal estimation regarding 'discrimination' and 'comparative judgment'; these items necessarily involve development and maturity of higher mental processes.

Task-oriented Time Estimation

The general findings of this study are reflected and supported by a measure of insight into the nature of estimation of time interpolated by task administered to the children. The time interval occupied by a task is beyond the span of measurement in children below the age level of seven

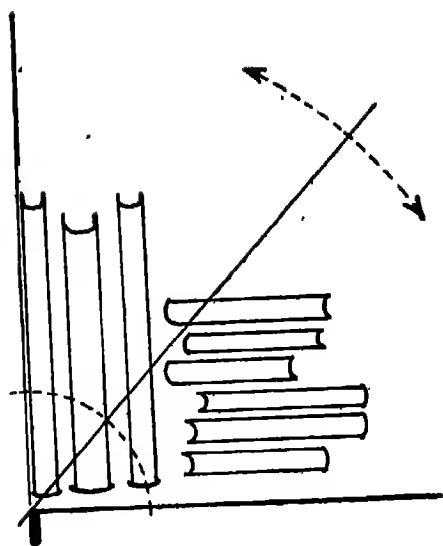
years, when estimation is fluctuating and nowhere near the actual/standard time taken (ranging from 5 times to 80 times). Significance of difference shown in Table 6 indicates a more or less accurate estimation around the age level of 7-8 years in comparison to that of adults. There is no clear difference in the two sexes.

From the result and discussion of the findings, it may be observed that development of notion of temporal estimation in children is a slow and gradual process, having its transitional point at the age level of 7-8 years and above. The true concept, however, develops around the age level of 10 years in both boys and girls alike. Moreover, this notion of estimation is evidently dependent upon cues of personal involvement. The findings support Fraisse (1963) and Springer's (1952) observation, though do not claim to support Piaget's (1969) observation. Dependence of NTC on numerical (mathematical) concept (Hurlock, 1964) is evident in this study, too. Non-availability of data and deletion of items on 'historical time' and 'concerning peers' indicate a close relationship of time concept with personal involvement in the task-oriented activities and immediate experience of children in general.

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Book Reviews

The Creative Potential and Education

N. K. Dutt and Gurbaksh Lal, Indian Book Agency, Ambala Cantt., 1977,
pp 100, Rs. 20.00

THIS slim volume emanates from the authors' creative strivings. It symbolizes their creative thinking in the field of education. The authors observed: "There comes a time in the life of every genuine thinker when he feels like penning down what he has been contemplating in terms of certain images. This is frankly the genesis of this book". Even though they have penned all that makes this book possible—the creative or restlessness—the book is neither going to rock the creativity literature nor is it going to add any new dimensions to it. The "material" presented in this book is neither new nor startling. The authors don't have any exciting revelations to make.

The book starts with the chapter on 'The Release of Creative Potential' in which an attempt has been made to discuss various approaches for the release of creativity. You find everything in it right from breeding to meditation, except education (!). The authors agree "we do not know much". Some unwieldy and glib statements raise serious doubts. They sound hazy, though romantic :

To release the creative potential (lying dormant like a serpent, the 'Kundalini', at the base of the spinal cord according to *Hatha Yoga*) we must attack upon all the fronts simultaneously, i.e. the front of here-

dity, the front of physiology, the front of education, the front of meditation, the front of certain psychotherapies, etc. The process of oversimplification, i.e. the process of thinking in terms of a single cause, may be described as the original sin of the intellect; it does not matter whether this sin is committed by Adam and Eve, Marx or Freud, Adler or Medougall. We have to make a multipronged attack on all the fronts at one and the same time.

At times, the authors, even at the cost of being irrelevant, have been unduly sensational. Will selective breeding really improve the human stock and consequently human creativity? It is anybody's guess. Aldous Huxley reminded us that although biological evolution consists of transmission and transmutation of genetic components, it is no longer a fruitful source of renewal; rather it is cultural evolution, the transmission and transmutation of cultural knowledge and values, which is the base of the *paideia* we seek. The authors have identified the physiological front with nutrition, therefore, they admonish: "A lot is to be done at the nutrition front." In the absence of the solid research evidence, such statements are irrelevant gibberish.

Theories of creativity form one full chapter. Theories of psychoanalysis, gestalt, association, etc. have been discussed. A renowned author (Arthur Koestler) has been quoted for synthesizing theories of creativity and producing a biosociation theory of creativity. It may be noted that there are many inconsistencies in Koestler's theory. Koestler has certain fatal flaws in his theory as well. A pertinent observation made by the authors points out the absence of any major and convincing theory of creativity. It reminds the reviewer of Jackson and Messick who maintained that the day on which we are certain about how to construct a theory of creativity will also be the day on which we are certain about how to construct a poem.

The chapter on the theories of creativity is followed by a chapter on the meaning of creativity. This arrangement of chapters is whimsical. This chapter draws mainly from the works of other writers mostly Guilford, Torrance and Mednick. This chapter has also listed some of the abilities which can be classified under 'Creativity Syndrome'. It may be noted that Torrance never made use of The Torrance-tests of creative thinking while at Minnesota. The later chapter on creative personality is much better. It describes systematically the characteristics of the creative person and how they can be useful in identifying a creative person. How parents and teachers stifle creative potential has also been discussed. Though there is enough material for the benefit of the teachers, parents may not find much in this book. Parents at certain times are more important as far as potentiating the creatively gifted talent is concerned.

The home environment is the best guarantee of having creative children. "The best encouragement is not instruction in problem-solving, but a home environment so rich, so open, and so stimulating that child can't help but grow as a creative human being" (Maynard). Principles of creative teaching have been discussed though not with much clarity. Some of the statements seem interesting: "A creative teacher possesses abilities included in creativity syndrome in abundance and makes use of them in various teaching learning situations (p. 49). A creative teacher has a strong desire to go deep into the sea of unknown and illumine himself by the golden rays of the sun of knowledge. He is accustomed to independent thinking and his rich imagination constantly overflows the banks of his mind. Moreover, he always yearns to nourish the creativity of children so that it may blossom forth and spread its fragrance" (p. 49). Probably the meatiest parts of the whole volume are chapters on creative reading, creative writing and creative oral expression. Attempts have been made to elaborate the techniques which can be useful in developing creativity. There is a chapter on brainstorming as an aid to creative thinking. Creative problem-solving, which includes brainstorming, is a more useful technique for promoting creativity in children. How brainstorming could be really used in the classroom situations is not clear from this book. This is, perhaps, a great challenge which one could face. There is every justification for a chapter or two on strategies for creative teaching. Learning experiences, which can be built into instructional materials to facilitate creative behaviour, can be included in such chapters. That would have made it quite a useful and practical book for teachers.

A chapter on the assessment of creativity has been included in the end. Why this becomes the last chapter is enigmatic and a disturbing aspect of this book. Some known and relatively less known cognitive tests of creativity have been discussed. Some Indian tests have also been described. These are Mehdi's tests, Majumdar's (found to have high predictive validity for achievement in science courses) and Gurbuksh Lal's test of creativity. If there is any justification for describing these tests of creativity, there is every justification for describing other useful and promising tests of creativity also.

Though this volume has some major and minor limitations, yet it is comprehensive and well suited for its main purpose of familiarizing the professional with the nature and development of creativity.

M. K. RAINA



Curriculum Development and Evaluation in Education

Arvinda Chandra, Sterling Publishers, New Delhi, 1977,
pp. 99, Rs. 25.00

A BOOK on curriculum is welcome since the country abounds with pseudo-expertise and confusion in this regard. However, the book by Dr. Chandra has not been able to live up to the promises of a rather patronizingly kind foreword written by no less a person than Dr. M.B. Buch, Director, CASE, Baroda. For reasons other than strictly academic, there usually is an eagerness among the aspiring authors to write a textbook of some kind, sooner the better. This author has in fact written a textbook for home science students but has rather hypocritically declared that the book has been "primarily compiled as a textbook for students of education and psychology" and that it can be equally useful for the students of other disciplines including home science.

The book has been divided into three principal sections. The first section deals with curriculum development in education (36 pages), the second deals with teaching for effective learning (23 pages) and the third on evaluation (41 pages). The foreword declares that the book contains references to many pioneering works in curriculum development in the country, whereas out of a total of eight references cited in this section only one Indian reference and two of the author's own (one of these unpublished) could be seen. Mention of the commissions in the text and not in the bibliography leaves one puzzled. There are no original suggestions as indicated in the foreword, not to mention some glaring statements of the obvious. A few survey-type researches of the author have found place in the text with or without direct relevance. Sometimes a tendency of oversimplification is seen as in the case of learning theories. The portion on educational objectives will raise some valid objections although it is large and illustrated. The examples contain statements and objectives which are not as unambiguous as those which Bloom, Mager, Grandland, etc. would have liked.

In about 20 pages one cannot sweep the entire backyard of the complex phenomena of teaching and learning, but the author has tried to do so. Consequently, there is a lack of consistency in the scale of details and a tendency to be swept away by free associations. The author summarizes his conclusion as "effective teaching, in short, results in effective learning", which is certainly going to be quoted by the students! The portion about measurement of teacher-effectiveness is largely borrowed and without much relevance. Printing in India has always been plagued by the printer's devil,

so a reviewer does not usually dwell upon it. But it is quite another matter when there is a consistent misprint (seven times in two pages of the very name of the person who has been quoted so often and has written so kind a foreword for the book), especially when somebody has been lavishly thanked for going through the manuscript carefully.

The final section deals with evaluation. One Arny has been quoted as saying that evaluation need not be confused with measurement, but that is precisely what has happened in the rest of the section, a large part of which has been devoted to different "evaluative instruments," i.e. tests. The examples taken from someone else's work in home science duly acknowledged in the preface are mostly unimpressive. The examples of multiple-choice items ending with 'all of the above' and 'none of the above' and, e.g. the ones on language development and educational psychology, seem to have more than one answer equally acceptable, and above all, the items having unequal number of alternatives show how all the voices of a non-edited test could be reflected in 20 items. The examples of multiple matching type has been borrowed from Knudsen, but are quite foreign to the Indian students because the AGCT is not used here. The section gives you a sense of unfinished task and ends abruptly with a note on rating scales.

The book will be useful for backward students of home science but is not recommended for any other group. I do hope for a day when a more effective method of screening the manuscript for publication will be evolved.

C.H.K. MISRA



The Non-Graded School in India

G.N. Kaul, Sterling Publishers Pvt. Ltd., New Delhi, 1977, pp 113, Rs. 25.00

Two things are undeniably true of Indian education : (i) the formal system has failed and hence problems like mass illiteracy, alienation of the educated section of the population, etc. and (ii) there are not many people who

have either ideas, patience or means to experiment in this field. The claims of the experimenters have been vastly disproportionate to the actual merit of the experiments. Perhaps that is what explains for their poor acceptance. The present book also has references which go to show how original, unique and innovative the author has been. ("The present author has been one, if not the main, sponsor of the innovation .."—INTRODUCTION)

The author has taken pains to describe how the idea, on which his book is based, came to be accepted out of the many which were once floated in India. He calls this indigenous because it resembles the older practice in India where the Gurus did not have to show attendance registers to any higher authority. Things have changed since then and, therefore, the external resemblance alone cannot count for much. I have no intention of belittling the ungraded system or of denying its Indian heritage. But the way it has been advocated and its 'revival' sought cannot arouse much enthusiasm. The non-graded school, as it is projected today, has no resemblance whatever to its ancient counterpart. Perhaps the whole history part is irrelevant. A non-graded school, as the author puts it, is a school without gradens. I doubt if it is unique in any sense except in its possible acceptance. Has the author made any experiment to assess its level and degree of acceptance? If not, the entire exercise is a theoretical formulation of an idea which may have practical value, provided it were put to practice. In fact the present book is an attempt to formalize a concept into an acceptable practice. That is why the author gives details of class organization, timetable, evaluation, teacher-training, etc.

The author has pleaded for the acceptance of the non-graded system for the tribals and weaker sections of the society (p. 77). Why tribals or the weaker sections alone, if the experiment has any positive value? And not to be beaten in modern practices as well, the author has "assumed, that a knowledge of preparing programmed material will prove of much use to those teachers who are interested in preparing sequential units for use in ungraded schools".

In brief, the book is a good introduction to the concept of the non-graded school and its future possibilities. Dr. Kaul has done well in providing all necessary tips for its implementation. Some day when the scheme is accorded acceptance, the author might be pleasantly surprised to learn that his book has been made a compulsory guide for teachers, administrators and planners.

SUJATA RAGHAWA □

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Certain Sociological Background Variables of Self-Esteem in High School Children

A Study

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THE SYMBOLIC social interactionists (Cooley, 1902; Mead, 1934) address their theory to the social person, whose "self is a cognitive structure of qualities (traits and attitudes) which develop out of interaction between the organism and stimulus events, mostly other persons. In the course of these interactions, the individual experiences himself not directly but only indirectly from a particular standpoint of other individuals, members of the same social group (Mead, 1934, p. 138). This sociological theory offers perhaps the most extensive explanation of the relationship between social factors and the development of the self-worth Self-esteem, therefore, is considered a social construct which is heavily subscribed on the social environmental contingencies, since it is evolved in terms of social reality (Ziller, *et al.*, 1969).

A person is oriented with favourable or unfavourable attitudes towards himself in the light of the standards which are important to people around him. Individual's success in social status and its accompanying evaluative responses by others of the social group, has a high reward value to the person. This appraisal has a strong personal significance to

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him that gets bound down into the fabric of his life. Though, children are not by themselves exposed to attain these status, which fetch favourable reactions from others, they share the benefits and privileges their parents enjoy in the social class. They are also conscious of such social distinctions which function as a result of the parent's position on the social class hierarchy (Radke, *et al.*, 1959 ; Bronfenbrenner, 1958).

The assumption here is that the social status is one of the most striking indices of prestige and success. Persons higher in social hierarchy have more prestigious occupations and higher incomes and tend to live in spacious and luxurious homes located in well laid out localities. These persons are considered more successful in life and they tend to receive material and social benefits that might prompt them to believe that they are generally more superior and relatively worthier than others. It is reasonable to expect, therefore, that one's self-esteem varies directly with one's social background. Persons from lower social class are exposed to more learning conditions in which the relative inferiority of their physical and social situations may translate into self-feelings of inferiority, worthlessness and submissiveness. Conversely, the upper class individuals are associated with conditions of occupational and social prestige and power, which helps to promote a greater feeling of self-worth, confidence and dominance (Kulwant, 1967 ; Bieri and Lobeck, 1961).

Sterility of literature on the influence of social class difference on self-evaluation of individuals has led to considerable disparity in the findings and consequently an absence of unanimity about the relationship between social status of an individual and his self-esteem. The most relevant study in this area is that by Rosenberg (1965) where he affirms the assumption that the differential evaluation of groups in society would be reflected in the self-evaluation of the group members. The more recent study by Coopersmith (1967) examines the influence of social class on self-esteem and the findings documented are both positive and negative with regard to the relationship between self-esteem and this sociological variable. Ziller, *et al.* (1969) indicates a more clear relationship between the two variables, while Sharma (1972) contends that social interaction affecting self-acceptance is influenced by a number of variables and socio-economic status of parents seem to be one of them.

There is some evidence that might be subsumed under the general fabric of research on self-esteem to indicate that feeling of self-worth is associated with certain sociological background variables like caste (Long, *et al.*, 1966), religion (Rosenberg, 1965 ; Adam and Rao, 1976), education of parents, mothers' employment (Bonifacio, 1971 ; Schodler, 1972), and to the birth order typology (Chemess, 1970 ; Eisenman, 1970). Cultural shaping of the concept of self assumes that the individual's self-

image and his interpretations of his own experience cannot be separated from the concept of the self that is normative in his social group (Schooler, 1972).

A few investigators seem to maintain that the sex of the child is an important factor which needs to be considered in estimating self-evaluation of children (Mason, 1954 ; Matteson, 1974 ; White, 1971). Sex differences with reference to self-acceptance scores of college students have also been reported (Deo and Bangia, 1968). While factor analysing self-esteem, Berger (1966) found no sex differences in the self-esteem scores of high school students.

Enumerating on the importance of familial variables, Gecas (1972) indicates that parents' support and control behaviour affect adolescent self-esteem. Sex differences are also indicated in parents' perception of their children's self-evaluation (Bladsoe and Wiggin, 1973), which plays a crucial role in the development of adolescent self-esteem (Staton, 1963). These variations, however, emphasize an indication that some contexts in the child's social environment are more important sources of self-esteem and feeling of authenticity than are others.

Considering the sociological and conceptual assumptions which enumerate the importance of the social-environmental factors in the self-esteem of adolescents, it was hypothesized that the increase in the socio-economic status has a tendency to be accompanied by an increase in self-esteem scores. It has also been presumed for the purpose of the present investigation, that the self-esteem orientation is manifest in boys and girls differently. A few additional hypotheses that generated from the examination of the relationship between self-esteem and some of the background variables of the social fabric are : mother's education and employment are considered significant factors in the self-esteem of the high school youth. The study further attempts to examine the relationship between self-esteem and the two cultural bases of self-knowledge, viz. religion and caste. An attempt is also made to study the relationship of self-esteem to sibling placement in the family.

Self-esteem refers to the value a child or youth puts on himself and his behaviour. It reflects how a child or a youth regards himself across a wide spectrum of activities in different contexts. Coopersmith's (1967, pp. 4-5) definition which considers self-esteem as "the evaluation which the individual makes and customarily maintains with regard to himself", seems to reflect adequately, for the purpose of the present study, the concept of self-esteem as propounded by the self theorists (Bischof, 1964 ; Wylie, 1965). The three most commonly-used status symbols, viz. father's education, father's occupation and father's income were employed for determining the socio-economic status of an individual.

METHOD

1. *Subjects*

The sample consisted of 220 subjects equally distributed over the two sexes, randomly drawn from Classes VIII, IX and X from six high schools of Bangalore city. The mean age was 14.58 and 14.63 for boys and girls, respectively.

2. *Measuring Instruments*

The subjects completed the 50-item Coopersmith self-esteem inventory, adopted for Indian sample earlier (Rao, 1975). Students responded to the items on the inventory by checking either 'like me' or 'unlike me' as an indication of their self-worth. Each answer, reflecting the high esteem received two points for a total of 100 possible score points. The inventory provides separate scores on four sub-scales, viz. general self, social self-peers, home-parents and school-academic, as well as a composite score on the total inventory. A lie scale runs through the scale items to check the effect of 'faking good'. Additional verbal instruction,* over and above the standard instructions provided in the standardized tool, given during the administration of the inventory by explicitly drawing attention to the lie scale, helped to reduce considerably the amount of 'faking good'. There seems to be little risk in adopting this 'warning technique' as a standard approach in personality assessment.**

The students also completed the socio-economic measure of Kuppa-swamy (1962), urban form, which yielded a combined index on the level of father's education, occupation and income. The obtained indices on

*The following verbal statements were added to the instruction : "Answer all the questions as they apply to you as an individual. Sometimes people make themselves out to be better than they really are. Therefore, the inventory includes something to check on this, as for example, how would you answer the statement : "I never tell lies" . . . ? If you answer "Like me" then this would suggest that you are not really being honest. Because everyone tells a lie sometime. So, do try to be truthful in all your answers."

- ** 1. Braun, J.R. & B.J. Gomez, "Effects of Faking Instructions on the Eysenck Personality Inventory", *Psychological Reports*, 19, 388-390, 1966
 2. Nias, D.K.B., "The Effect of Providing a Warning about the Lie Scale in a Personality Inventory", *The British Journal of Educational Psychology*, 42, Part III, 308-312, 1972
 3. Power, R.P., & D.O. Donovan, "Detection of Simulation on the MPI by Subjects Given the Rationale of the Lie Scale", *The British Journal of Psychology*, 60, 535-541, 1969

SOCIOLOGICAL BACKGROUND VARIABLES OF SELF-ESTEEM

the measure provides a classification of the sample into five categories, namely, upper class, upper middle class, middle class, lower middle class, and lower class. For statistical convenience, these five categories were rearranged into three broad categories, viz, the upper class, the middle class and the lower class. This was facilitated by merging the two intermediary groups with the upper and the lower ends of the continuum and retaining the middle group.

Information on the level of mother's education and occupation was also collected separately. Based on this information, the Ss were divided into four categories on the basis of their mother's education level. The first group had mothers who had higher education and were also professionally qualified to be employed as college or high school teachers, personal secretaries and bank officers. Mothers of the students who formed the second group had high school education or incomplete college education with additional diploma in teaching, nursing or tailoring. The third group had mothers who had done a few years of schooling. The last category included students whose mothers were mostly illiterate and had no formal schooling. Data obtained on religion, caste and birth-order typology yielded three major groupings of the sample under each of the variables. The median score was used to obtain a cut-off for determining the two levels of self-esteem, namely, the high self-esteem and the low self-esteem.

3. Results

The scores on the total self-esteem inventory ranged from 36 to 90 with a mean of 61.93 and SD of 11.86. The mean scores on 110 boys for all the items on the inventory was 61.18 and SD 11.15, and the mean score for the 110 girls was 62.85, and SD 11.96. The difference between means for boys and girls was, however, not significant. The means and SDs on the total inventory along with the means and SDs calculated for the four sub-scales separately have been given in Table 1.

Table 1
MEANS AND SDs OBTAINED FOR THE TOTAL SCORE AND SEPARATELY
FOR THE FOUR SUB-SCALES OF THE SELF-ESTEEM INVENTORY

	Total N		Boys		Girls	
	Mean	SN	Mean	SD	Mean	SD
Total self-esteem scale	61.90	11.91	61.18	11.80	62.85	11.96
Sub-scale 1 (General self)	43.20	7.13	46.32	7.33	41.03	8.21
Sub-scale 2 (Social self peer)	9.81	3.21	10.35	4.01	9.98	3.39
Sub-scale 3 (Home-parent)	8.83	3.45	6.43	3.12	9.33	3.46
Sub-scale 4 (School-academic)	7.54	3.16	7.06	4.22	8.99	3.56

Examination of the data relevant to the hypotheses concerning the relationship between the socio-economic status and self-esteem was accomplished by means of chi-square test of analysis. The data are summarized in Table 2. The results reveal that the self-esteem scores has a tendency to increase with the social class. The association of the two

Table 2
SOCIO-ECONOMIC STATUS OF FATHER AND SELF-ESTEEM OF CHILDREN

<i>Social Class Categories</i>	<i>Boys</i>		<i>Girls</i>	
	<i>High SE</i>	<i>Low SE</i>	<i>High SE</i>	<i>Low SE</i>
Upper class	32.1% (18)	9.3% (5)	24.6% (14)	7.5% (4)
Middle class	39.4% (22)	37.0% (20)	47.3% (27)	49.1% (26)
Lower class	28.5% (16)	53.7% (29)	28.1% (16)	43.3% (23)
Total	100.0% (56)	100.0% (54)	100.0% (57)	100.0% (53)
	$X^2=11.49$, df 2, $p < .01$		$X^2=6.81$, df 2, $p < .05$	

variables is more obvious in the case of boys than in the case of girls. The chi-square obtained on the total sample of 220 cases was 17.470, which is significant for 2 df at 1 per cent level. The hypothesis that the children with high self-esteem tend to come from higher socio-economic strata is supported. This result is similar to those reported earlier by Rosenberg, Coopersmith and Ziller.

An explanation for the sex difference in the overall relationship between self-esteem and socio-economic status was sought in the analysis of results under each sub-scale of the self-esteem inventory. Table 3 provides the chi-square values obtained for boys' and girls' samples separately under each sub-scale title.

Table 3
CHI-SQUARE VALUES BETWEEN SELF-ESTEEM SCORES AND SOCIO-ECONOMIC STATUS UNDER DIFFERENT SUB-SCALE TITLES

<i>Sub-scales</i>	<i>Boys</i>	<i>Girls</i>
1. General self	9.356**	1.755
2. Social-self-peer	6.351*	6.361*
3. Home-parent	2.053	7.723*
4. School-academic	0.832	5.994*

* $p < .05$

** $p < .01$

SOCIOLOGICAL BACKGROUND VARIABLES OF SELF-ESTEEM

It is obvious from the data in Table 3 that there is contextual variation in terms of the relationship between self-esteem and socio-economic class. Class difference is pronounced on the 'general-self' sub-scale and the 'social-peer' sub-scale for boys and on the 'home-parent', 'social-peer' and 'school-academic' sub-scales for girls. All these five values are statistically significant though the relationship on the girls' sample register only a lower level significance.

Further computations of mean difference between boys' and girls' sample on different sub-scales generated five t-values out of which only two were statistically significant endorsing a differential self-esteem on general-self sub-scale and the home-parent sub-scale (General-self SE, $t = 2.386$, $P < .02$, in favour of boys and home-parent SE, $t = 2.056$, $P < .05$ in favour of girls).

The focus of the study on mother's education and employment received mixed support from the analysis of the data. Mother's education has not been found significant though the data register a strong tendency of children whose mothers had completed high school education and sometimes had a post-high-school training or diploma to hold their esteem higher than those children whose mothers had done only a few years of schooling. However, girls seem to attach more importance to mother's level of education ($X^2 = 5.087$, $df = 3$, $P < .20$) than boys ($X^2 = 3.01$, $df = 3$, $P < .50$) while evaluating their worth. The data is presented in Table 4.

Table 4
MOTHER'S LEVEL OF EDUCATION AND CHILD'S SELF-ESTEEM

Mother's education	Boys		Girls	
	High SE %	Low SE %	High SE %	Low SE %
1. Higher education	7.1 (4)	11.1 (6)	8.8 (5)	7.5 (4)
2. SSLC+/and Diploma or Certificate	50.0 (28)	37.0 (20)	49.1 (28)	30.2 (16)
3. Up to SSLC and below	19.4 (11)	29.6 (16)	31.5 (18)	43.5 (23)
4. No formal education	23.5 (13)	22.3 (12)	10.6 (6)	18.8 (10)
Total	100.0 (56)	100.0 (54)	100.0 (57)	100.0 (53)
$X^2=3.01$, df 3, $p < .50$		$X^2=5.08$, df 3, $p < .20$		

Maternal employment, irrespective of mother's education, seems to contribute to higher estimation of child's self-esteem, provided the socio-economic status of father is considerably high. Sixty per cent of the children of employed mothers whose spouses held prestigious occupations invariably evaluated themselves high on self-esteem, whereas 40 per cent of children of working mothers whose self-esteem was low, had either their fathers holding low paid job or in most cases, dead (50 per cent). The data failed to support the religious base for differential evaluation of one's self-worth, although Hindus seem to estimate their self-esteem higher than the Christians and Muslims in this sample (Table 5).

Table 5
RELIGIOUS AFFILIATION AND SELF-ESTEEM

Religion	Boys		Girls	
	High SE %	Low SE %	High SE %	Low SE %
Hindus	66.1 (37)	55.6 (30)	61.4 (35)	52.8 (28)
Christians	19.6 (11)	25.9 (14)	19.3 (11)	28.3 (15)
Muslims	14.3 (8)	18.5 (10)	19.3 (11)	18.9 (10)
Total	100.0 (56)	100.0 (54)	100.0 (57)	100.0 (53)
$X^2 = 1.279$, df 2, p < .70			$X^2 = 1.247$, df 2, p < .70	

Even though social class and religious affiliation do not seem to show very strong relationships to self-esteem when viewed independently, their cumulative effect looks more substantial. The comparison of lower class Hindus with the upper class Christians and Muslims illustrates this observation. Fifty-eight per cent of the lower class Hindus, whereas 39 per cent of the upper class Christians and 38 per cent of the upper class Muslims had high self-esteem where a difference of 19 per cent to 20 per cent is noticed. It was more conspicuous among the boys as the social class difference on self-esteem was more clearly borne out by this group. Though the smallness of sample does not allow for a strong evidence, a reasonable speculation about the association of self-esteem to specific combinations of sex, social class and religion is not altogether ruled out.

The data was recast on the basis of caste typology which is presented in Table 6. Brahmins and the high caste non-Brahmins seem to have high self-esteem which is more pronounced among the girls.

SOCIOLOGICAL BACKGROUND VARIABLES OF SELF-ESTEEM

Table 6
PERCENTAGES IN THE TWO SELF-ESTEEM GROUPS BY
CASTE AND SEX

Self-esteem level	N		Total		Boys		Girls	
	High %	Low %	High %	Low %	High %	Low %	High %	Low %
1. Brahmin	38	23	62.3	37.7	60.0	40.0	64.6	35.4
2. High caste non-Brahmin	23	19	54.8	45.2	44.4	55.6	62.5	37.5
3. Low caste Hindu + Harijan	11	16	40.8	59.2	52.6	47.4	00.0	100.0
3.(a) Harijan	5	2	71.4	28.6	83.3	16.7	00.0	100.0
4. Christian	22	29	43.1	56.8	44.0	56.0	42.3	57.7
5. Muslim	19	20	48.9	51.1	44.5	55.5	52.4	47.6

The absence of cell frequency for high self-esteem among the lower caste Hindu+Harijan sample among girls is conspicuous. The segregation of Harijan sample from this category further affected the self-esteem position considerably. The Harijan students invariably registered a high self-esteem. Further analysis was, however, not feasible due to the meagre sample in this category.

For statistical convenience the groups were brought under three broad classifications, viz. Brahmins, the high caste non-Brahmin+the Christian, the low caste Hindu, Harijan+Muslim. A simple one-way ANOVA,

Table 6 (a)
RESULTS OF ANOVA ON CASTE AFFILIATION AND
SELF-ESTEEM BY SEX

	df	'F'	Remarks
1. Total Sample	2/217	4.63*	P < .05
2. Boys	2/107	2.001	NS*
3. Girls	2/107	3.02*	P < .05

*NS = Not significant

run through the data yielded a F-ratio of 4.63, which is significant at 5 per cent level with 2/217 degrees of freedom. The two F-ratios on the two sex groups did not provide any significant results though the girls

sample was very near significance at 5 per cent (boys; $F=2.001$, $df\ 2/107$, $P > .05$, girls; $F=3.02$, $df\ 2/107$, $P < .05$).

Using the birth-order typology, the individual's sibship placement in the family was determined. Table 7 gives the sample distribution over the sibling structure.

Table 7
BIRTH-ORDER AND SELF-ESTEEM BY SEX

Birth-order categories	Total ¹		Boys ²		Girls ³	
	High SE	Low SE	High SE	Low SE	High SE	Low SE
1. Only child	29	10	14	4	15	6
2. First born	13	15	7	8	6	7
3. Second born	9	12	4	6	5	6
4. Third born	25	31	13	20	12	11
5. Later born	36	34	17	14	19	20
6. Last born	1	5	1	2	0	3
Total	113	107	56	54	57	53

¹ $X^2 = 10.07$, $df\ 1$, $p < .01$

² $X^2 = 6.21$, $df\ 1$, $p < .01$

³ $X^2 = 3.98$, $df\ 1$, $p < .05$

Mere birth-order placement seem to have less explanation to offer in the self-esteem variation in the sample. What seems to be of considerable interest is the fact whether the child has any brothers or sisters. It is, therefore, not too important whether one is first, second, or third in the family, but one's position in terms of sibling distribution as, for instance, only son in the family with other siblings being only daughters or only daughter in a family with all male siblings is what that accounts more for the variation in self-esteem. The chi-squares obtained to find the relationship between self-esteem of the only child and children with siblings yielded significant results (total N , $X^2 = 10.07$, $df\ 1$, $P < .01$; boys, $X^2 = 6.21$, $df\ 1$, $P < .01$; girls, $X^2 = 3.98$, $df\ 1$, $P < .05$). More than being only child, the rarity of the species in the family also seems to account for the differential self-esteem status. Ninety per cent of the lone girls and 94 per cent of lone boys with more than three opposite sex siblings had high self-esteem.

DISCUSSION

The major hypothesis of the study that self-esteem is related to socio-

economic status was generally confirmed. Though the girls seem to be less concerned about their social class membership than boys, a reasonable interpretation of the relationship of self-esteem with socio-economic status, therefore, is that this presumed relationship is especially an ascribed one rather than an achieved status for children. So, it can be assumed that the differences in one's evaluation is a result of differential experience of success and failure due to one's affiliation to various social class positions rather than the prestige bestowed in general by the society (Luck and Heiss, 1972). It can be safely admitted that children from higher social strata are inclined to have more ego-enhancing material and cultural benefits and receive more respectful treatment from others in the society than the children from the less privileged groups.

It seems reasonable to believe that parents of the upper social strata have higher aspirations for their children. Consequently, they can afford to provide more money, time and facilities to them, by virtue of which the offspring reckons themselves high on social prestige. On the contrary, the condition of material and non-material scarcity with the lower class parents is likely to leave children in a disadvantageous position in terms of their self-evaluation.

Further information on self-esteem difference on the various sub-scales of the tool reflect a context bound self-esteem for a more agreeable explanation. The phenomenal sex difference in self-esteem is also substantiated. A further look at Table 3 indicates that self-image of an individual can be conceived of as being an object in the individual's perceptual field. It is presumed that self-esteem is being considerably affected by the frame of reference which the individual adopts from a dominant reference group in which he is motivated to gain or maintain acceptance. With the use of the logic of this argument it is reasonable to infer that boys and girls derive differential satisfaction for developing their self-worth from varied sources. Boys seem to be more personally oriented than girls. It is suggested that this finding would be a reflection of the salient influence of sex norm qualities on self-development. Parents may invest higher aspirations for their sons, because they realize that he will have to be disciplined more, since eventually he will have to support a family. A commonly held opinion is that boys are wanted more than girls for specially religious and economic reasons in our society. It could be possible that unusual stringency measures adopted by parents in especially high and middle class homes in shaping their adolescent sons through the exercise of more authority and power, leads to variability of self-esteem in transcontextual situations, and thus the

individual fixes the frame of reference in various areas of social interaction which ultimately satisfies his self-identity. The insignificant chi-square value of the home-parent sub-scale and the significant value on the social self-peer sub-scale on the boys' sample substantiate the above finding. On the other hand, a girl may be valued more in terms of her feminine role as home-maker and is likely to be more protected and trained for finer pursuits, especially in the higher and middle class homes. Apparently, the nature and quality of activity in which a parent involves himself with his children affects the development of the dynamism of self.

Peer SE is generally high in both sex groups. Adolescence is a period where the peer group functions a tremendous role (Coleman, 1961 ; Staton, 1963) in contrast to the home environment where conflict will be on the rise irrespective of the social class status (Sinha and Gangrade, 1971). The lower class individual is at a disadvantage on both these sources. It could be plausible to admit that these children, because they live in an environment affording fewer rewards from both those referent groups for self-acceptance, come to expect a low degree of success than their middle class peers. In general, the result lends support to these hypotheses that low class children display lower esteem.

The relative lower self-worth gain in terms of the school academic context could be attributed to the more basic human anxiety and particularly that of adolescents which might account for the lower frequency in the high esteem cells. Considering school environment as a salient status variable for our youth, since he perceives himself as a member of a select group by virtue of his school attendance, it is contended that teachers have obligations to foster positive self-esteem among students which are indicated in the earlier studies (Trowbridge, 1972 ; Aspy, 1971 ; Kleinfeld, 1972). Results of the findings on the association of religion and self-esteem indicate an absence of a clear relationship between two variables. Though the religious groups are differentially evaluated in the broader society, but for a school youth, a more constructive interpersonal environment is his neighbourhood. Contradictions within this effective environment might affect his self-acceptance rather than the impersonal, outside social group. This might be the reason why for the school youth, the prestige of his membership groups in the open society may have relatively lesser effect upon his level of self-evaluation.

Results on the examination of material employment also reveal a positive function of this social background variable on child's self-esteem. Children coming from families where father's socio-economic status was low showed a clear tendency of low self-evaluation irrespective of mother's higher and even sometimes, professional qualification. The

fact that the nature and type of maternal employment and motive for working tends to vary with class, should be taken cognizance of. Since maternal employment of children with high self-esteem do not present a case of an absolute economic necessity, it might reflect a more personal aspiration for a materially enhanced way of life. The more educated from higher social strata have both material and personal resources to evince higher ambitions in their children for further upward mobility in the society for both monetary and prestige gains. The less educated are relatively content and remain stable with less of upward mobility aspirations. It is, therefore, contended that a child's self-esteem depends not so much on maternal employment as to the motive for mother's working.

One might be disposed to relate parental interest in the child which is considered to be of primary importance in the child's evaluation of worth, differentially to the level of sex of children, from a study of sibling position in a family. It could be convincing to hold that in a large family with many children, it is likely that parents stake their aspirations and interests on those children who seem to be promising. On the other hand, in a single-child family the child tends to become the object of inordinate parental attention and importance and is always encouraged even for his mediocre attempts. Some more inferential evidence could be derived before any finding is authenticated on the pressure of religion on the sibship structure and its relative effect on individual self-esteem, which is desirable in the light of the traditional importance attributed to the child's sex in our Indian culture. A salient outcome of the study is the possibility of referring to a number of relatively independent dimensions of self-identity, when construct like self-esteem is under study. Generally, the single score on self-esteem on the complete tool may not give adequate explanation for the variation in the manifestation of self-esteem especially in the adolescent. Thus, a general categorization of 'high', 'low' on the total score can be misleading (Janis & Field, 1959).

To sum up, it would appear that generally hypotheses stated in the article on social class, sex, caste and birth-order were supported by these results; the findings do not yield explanation on mother's education and religious affiliation and, thus, further research in this direction, seems indicated. In common, the findings would provide directions in the dimensions of sex role norms in our society. Girls' sex role is more affected by other members of the family, specially sibling as well as the peer group while boys are more receptive to the norms of outside sub-culture. An attempt at the study of source which is capable of affecting the individual's ability—worth—conceptions could provide meaningful insight into

the self-evaluative studies. Because, self evaluation is considered to be affected by the subject's position relative to the reference group.

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Attitude of Postgraduate Students towards Internal Assessment

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An attitude scale designed by the author to measure the attitude of students towards internal assessment was administered to a group of 240 postgraduate students of a university where internal assessment is being tried as an experiment. The sample of students was selected by a three-stage stratified random sampling procedure. It was found that the second (final) year students who had undergone the system for one year had a significantly lower mean score than the first years. Male students favoured internal assessment more than the females. Generally, students of the science faculty had a more favourable attitude towards the system than their counterparts in the arts faculty. Nearly 70 per cent of the students expressed that internal assessment should be retained. But very few of them (16 per cent) preferred complete internal assessment. As many as 50 per cent wanted internal assessment for 50 per cent of marks only. Different aspects of the problem have been discussed.

EXAMINATION reform has become a problem for the educational administrators. The Education Commission (1966) observed :

This is one of those areas in education about which one can say that the problem is known, its significance is realised, the broad lines of the solution—at least to begin with—are known, but for some reason or other an effort to implement it on a worthwhile scale or in a meaningful manner has not yet been made (pp. 524-25).

The history of education in ancient India and elsewhere shows that debates, discussions and oral tests were the major tools of assessment in the olden days. But with the advent of the British on the Indian scene, written examinations and terminal system of testing came into vogue. The defects of this type of examinations are too well known to be repeated. The various committees appointed to go into the problems of education in general or examinations in particular have been unequivocal in their wrath against the system of one examination at the end of the year where, in just three hours, what has been learnt in over three hundred days is tested and the candidate's fate is sealed. How cruel it is, especially when the tools of assessment and the marking of the answer scripts are highly unreliable !

As early as in 1943 the Norwood Committee suggested the substitution of internal system of examinations in place of external examinations. The University Education Commission (1948) was so emphatic about the defects of the present pattern of examinations that it said : "We are convinced that if we are to suggest any single reform in university education it should be that of examinations". Bloom (1961) remarked that the examinations, as they are today, have reduced learning to a part-time activity, teaching to the coverage of syllabus and education to a relatively drab and meaningless activity. Taking examinations is viewed as a dreaded experience with great anxiety and emotional tension being developed by a majority of students. Luck and chance are regarded as powerful factors in determining the questions asked and the marks received. In the same way Prof. Nurul Hasan (1975), the then Union Minister of Education, pointed out in the Lok Sabha that the examination system in India has virtually collapsed and there is no use of trying to resurrect it even if we so desired. He added : "The tension it creates on the nerves of the students is good enough justification for bringing about changes in the examination system". The Secondary Education Commission (1954) also observed that examinations have succeeded in reducing the whole process of education into a mechanical routine of imparting and memorizing facts and recommended that the final assessment of the students should not be based on the results of external examinations alone, and that other things such as school records and internal tests should be taken into consideration. The findings of the Commission and its recommendations were fully endorsed by the Central Advisory Board of Education at its meetings in 1953 and 1954. The Education Commission (1966) also recommended abolition of set syllabi and the external examinations based upon them, and emphasized that they should be replaced by a system of internal and continuous evaluation by the teachers.

themselves In the UGC report (1962) on the problems of examination system, Dongerkery stressed the need for improvement of the method of teaching and learning and that examinations should periodically reveal to the student his progress in learning. This naturally serves as a basis for motivation and makes the student take appropriate steps to maintain or improve his mastery of the subject. Balabhadra Prasad (1961), Zaidi (1961), Jaganatha Reddy (1970), Misra (1971), Hill (1972) and many others have clearly pointed out the advantages of internal assessment.

There cannot be two opinions about the soundness of the recommendations to supplement, if not supplant, the external examinations by a psychologically and pedagogically sounder system of internal assessment, where the teacher plays a major role in assessment, because he alone is competent to judge the achievement of the students. Further, the results of the evaluation are expected to be used in guiding the teacher and the taught to modify the teaching-learning process, for, in a sound system of education, teaching, learning and evaluation should go hand in hand, each contributing to the development of the other.

In spite of the fact that so many have advocated the introduction of internal assessment (IA) in addition to, or in place of, external examinations, not much headway was made in this regard because equally many have been sceptical about the success of this system. It was introduced in many places at different levels of education, in different proportions, even during the 1960's. Unfortunately, the experience was that by and large, IA tended to boost the individual marks (Joshi and Srivastava, 1964 ; Misra, 1966 ; Kamat, 1968 ; Pratap Mouli and Rajagopalan, 1970 ; Tare, 1971 ; Hill, 1972 ; Venkata Rami Reddy, 1977 a and d). The reports about the percentage of passes in the Class VII public examinations of Andhra Pradesh held in March 1976, are interesting and quite revealing : Only 27 per cent of the students passed in the examination when only external (public) examination marks were considered. But when the marks obtained in internal assessment were also taken into account, prescribing 15 per cent in all subjects and 10 per cent in Hindi as the minimum marks needed in the external examination to secure a pass, the percentage of passes rose to 50. But when no minimum marks in the public examination was prescribed, the percentage of passes shot up to above 60. (*The Hindu*, 1976 ; April 19, p. 11 ; April 21, p. 11 ; April 22, p. 6).

These results are ample evidence to show how internal assessment has been bolstering the marks of students. Unfortunately this boosting was haphazard, influenced by several extraneous and unworthy considerations. Money, caste, creed and sex seemed to play their part. There were ins-

tances where a candidate who was awarded 24 marks out of 25 (96 per cent in IA did not pass in the subject because in the public examination he could not secure the minimum (30 per cent) marks needed—a bare 22 out of 75 ! The correlation between the marks obtained in IA and external examination varied from investigation to investigation and from subject to subject. In some cases, the correlations were negative (Raina, 1963 ; Kamat, 1968 ; Bennur, 1971 ; Venkata Rami Reddy, 1977 *a* and *d*). In view of such difficulties the procedure was withdrawn in many institutions (Misra, 1966 ; Amrik Singh, 1971, and Hill, 1972).

However, the UGC has decided to introduce the system starting with the postgraduate classes and it is being tried in a few universities on an experimental basis. The present investigation is intended to study the attitude of postgraduate students of a university college in one such university, towards internal assessment. As the system is being tried in this institution, it may reveal important aspects about the functioning of the system. Further, it is intended to find whether there is any relationship between intelligence and attitude towards IA, as it is held by some that intelligent students favour internal assessment.

SAMPLE

The sample of subjects (Ss) for the study was 240 students, selected by a three-stage stratified random sampling procedure. The different postgraduate departments in the university college were first divided into two groups as arts and science departments depending upon the faculty to which they belonged. Six departments from each of the two groups were selected at random. The students in each of the above two sets of departments were divided into two on the basis of the year of their study as first year (previous) and second year (final) students. Each of the above four groups of students were further divided into two depending upon their sex. Thus there were eight groups of subjects (2 faculties \times 2 years \times 2 sexes) in all. From each of the above eight groups 30 Ss were selected at random giving 240 Ss for the study. An examination of the sample of Ss showed that from each of the four sub-groups (2 years \times 2 sexes) in each of the 12 departments selected for the study at least three students were included in the sample.

Male and female Ss from both arts and science faculties were included in the study as it was intended to see whether there was any significant difference between male and female students and those in arts and science faculties in their attitude towards IA. All the Ss had the traditional system of examinations up to the degree level. By the time the experi-

ment was conducted the first year students had no direct experience with internal assessment, whereas the second year students had ample experience with the new system of evaluation. A comparative study of the attitude of these two groups of students may reveal some salient points. Hence, students from the first as well as the second year were included in this study.

METHOD

An attitude scale developed by the author for measuring the attitude of students and teachers towards internal assessment was employed in this study. At the outset, a number of statements about IA were collected from teachers, students, books, etc. The statements were sorted out with the help of experienced teachers and 52 statements that were considered to be relevant to measure the attitude towards IA were selected. The statements were worded appropriately taking necessary precautions about clarity, brevity, number of positive and negative statements, etc. (Likert, 1932) and a questionnaire with a five-point-rating scale was prepared. This pilot form was administered to a group of 200 male and female students in postgraduate classes and the criterion of internal consistency (Likert, 1932) was employed to find the validity of the items. This method was used as it is far less laborious, but yet yields as valid results as those obtained by the traditional method of item analysis (Likert, 1932; Edwards, 1969). Forty items that were found to possess high discriminative power were selected. There were 19 positive statements and 21 negative statements. The items were randomized and the final form was prepared.

The procedure employed for scoring was that advocated by Likert (1932) who emphasized that scores based upon the relatively simple procedure of assigning integral weights were almost equal to those obtained by the rather difficult procedure of assigning normal deviate system of weights; the correlation between the two sets of scores obtained by the two procedures was 0.99.

Weights of 1, 2, 3, 4 and 5 were given to the five categories of responses: strongly agree, agree, doubtful, disagree and strongly disagree, respectively, in the case of unfavourable (negative) statements. For favourable (positive) statements the scoring procedure was reversed, with the 'strongly agree' response getting a weight of 5 and the 'strongly disagree' response getting a weight of 1. Hence, the score on any item could vary between 1 and 5 and the total score of any individual would

range between 40 and 200 with 120 as the neutral point.

Two questions were added to the above scale. One of them was a specific question: Whether IA should be continued or not. This would give a direct answer to the burning question whether we should change over to the new system or not. The second question was intended to assess the opinion of the students whether they prefer partial IA or complete IA. The attitude scale was made anonymous as it would facilitate frank expression of opinions.

The split-half reliability of the instrument, corrected for full length, was 0.97 ($N=100$). As all possible items that are relevant to IA were collected from different sources and included in the questionnaire, it can be reasonably assumed to have content and construct validities. As each item had considerable discriminative power the scale could well differentiate between those who had a favourable attitude towards IA from those who had a negative attitude. The mean score of a group of students who did not favour IA was 118.28, which was significantly less than the mean score (132.11) of another group of students who favoured IA (t significant at 0.001 level), indicating validity of the scale (Venkata Rami Reddy, a).

In addition to measuring the attitude of the Ss towards IA, their mental ability was also measured to find the truth of the hypothesis that intelligent students favour internal assessment. To assess the mental ability of the Ss Raven's Standard Progressive Matrices (RPM) test was used. This test was selected because it is an interesting non-verbal test, completely free from culture loading and is suitable to be administered to students of any locality (Raven, 1971). Further, it is a power test, which eliminates errors in the score due to anxiety on the part of the Ss, as they are not required to work under stress of a time-limit. But this lack of a time-limit, though commendable in one way, brings with it certain administrative difficulties, as some Ss keen to finish the test tend to sit with it for an hour and a half or even more, necessitating cancellation of two or three periods of regular work of the institution. To obviate this difficulty one-half (odd numbered items) of the RPM was used to measure the mental ability of the Ss, as it was found that any half of the RPM (odd items or even items) is as good as the full test (Narayana Rao and Venkata Rami Reddy, 1972). The reliability and validity of the test were also established on samples of postgraduate students (Jaleel Sahib, 1975; Venkata Rami Reddy, c). The two instruments were administered to the sample of Ss in small groups in their respective departments under normal classroom conditions.

RESULTS AND DISCUSSION

An examination of Table 1 in which the means and SEs of the attitude

scores of the different sub-groups of Ss are presented shows that the mean scores of all sub-groups, except that of the final year female students in the arts faculty, were above 120, the neutral point, indicating a favourable attitude towards IA.

Table 1
MEAN SCORES AND SEs OF THE VARIOUS SUB-GROUPS OF Ss

Group	N	M	SE	t
APM	30	134.20***	2.89	2.74**
APW	30	123.07@	2.85	
AFM	30	125.20@	3.87	1.29@
AFW	30	119.13@	2.71	
APM	30	134.20***	2.89	1.86@
AFM	30	125.20@	3.87	
APW	30	123.07@	2.85	1.00@
AFW	30	119.13@	2.71	
AP	60	128.64**	2.16	2.00*
AF	60	122.17@	2.40	
AM	60	129.70**	2.49	2.70*
AW	60	121.10@	1.98	
SPM	30	133.47***	3.04	0.65@
SPW	30	130.90***	2.51	
SFM	30	126.63*	2.76	0.01@
SFW	30	126.57*	3.19	
SPM	30	133.47***	3.04	1.66@
SFM	30	126.63*	2.76	
SPW	30	130.90***	2.51	1.07@
SFW	30	126.57*	3.19	
SP	60	132.19**	1.98	1.93@
SF	60	126.60**	2.11	
SM	60	130.05**	2.10	0.45@
SW	60	128.74**	2.04	
APM	30	134.20***	2.89	0.19@
SPM	30	133.47***	3.04	
APW	30	123.07@	2.85	2.06*
SFW	30	130.90***	2.51	

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AFM	30	125.20@	3.87	0.30@
SFM	30	126.63*	2.76	
AFW	30	119.13@	2.71	1.78@
SFW	30	126.57*	3.19	
AP	60	128.64**	2.16	1.21@
SP	60	132.19**	1.98	
AF	60	122.17@	2.40	1.38@
SF	60	126.60**	2.11	
AM	60	129.70**	2.49	0.11@
SM	60	130.05**	2.10	
AW	60	121.10@	*1.98	2.69**
SW	60	128.74*	2.04	

1. A Arts Faculty
- S Science Faculty
- P Previous (I year)
- F Final (II year)
- M Men students
- W Women students

2. *** Significant at 0.001 level
- ** Significant at 0.01 level
- * Significant at 0.05 level
- @ Not significant at 0.05 level
3. For an explanation of the values and symbols in the third and last columns of the Table please see the text.

The *t*-test was applied to see whether the mean scores were significantly different from the neutral point. The results of this *t*-test (to find the significance of the difference between the mean and the neutral point) are shown by asterisks given along with the mean scores in the third column of Table 1. For example, it could be seen that the mean score of the first year men students of the arts faculty (APM) was 134.20***. The three asterisks indicate that the difference between the mean score and the neutral point was significant at 0.001 level. All the first year students of the arts faculty put together (AP), and also men students of the arts faculty in general (AM) had a significantly positive attitude. Neither the second year students (AF) nor the women students (AW) belonging to the arts faculty, had a significantly favourable attitude towards internal assessment. But in the case of the science faculty all the sub-groups had a significantly positive attitude towards the new system of evaluation. The mean score of the group as a whole was 127.40 which is also significantly above the neutral point (Table 3).

It may be of some interest to find out whether there is any significant difference between the mean attitude scores of certain sub-groups of Ss, say, male students of the first year in the arts faculty and female students of the first year in the same faculty. Hence, comparison between the

mean scores of all relevant pairs of sub-groups was carried out by applying *t*-test. The *t*-values obtained by applying this *t*-test (to find the significance of the difference between two sample means) and the level of their significance are shown in the last column of Table 1.

It could be seen that in the case of the arts faculty the mean score of the men students of the first year (APM) was 134.20, and that of the women students of the first year in the same faculty (APW) was 123.07. The difference between the two means was significant, the obtained *t*-value of 2.74 being significant at 0.01 level. This shows that the first year men students of the arts faculty had a significantly more favourable attitude towards IA, compared to their female counterparts. There was also a significant difference between the first year students of the arts faculty (AP) and those in the second year (AP); the mean attitude score of the second year was significantly less than that of the first year. Similarly, women students of the arts faculty (AW) exhibited a less favourable attitude towards IA, compared to the men students studying in the same faculty (AM). In the case of the science faculty, however, none of the differences between the mean scores of the different sub-groups was significant.

When the mean scores of the different sub-groups of Ss in the arts faculty were compared with the mean scores of the corresponding sub-groups in the science faculty, it was found that the women students of the science faculty (SW) had a significantly more favourable attitude towards IA than the women students of the arts faculty (AW). There was also a significant difference between the attitude scores of the first year

Table 2
ANALYSIS OF VARIANCE OF THE ATTITUDE SCORES OF THE Ss

Source	Sum of squares	df	Mean square	F
Year of study	1949.40	1	1949.40	6.96**
Sex	1288.07	1	1288.07	4.60*
Faculty	1118.02	1	1118.02	3.99*
Year \times Sex	308.26	1	308.26	1.10@
Year \times Faculty	40.01	1	40.01	0.14@
Sex \times Faculty	968.01	1	968.01	3.46@
Year \times Sex \times Faculty	6.03	1	6.03	0.02@
Within groups	64984.55	232	280.11	
Total	70662.35	239		

** F Significant at 0.01 level

* F Significant at 0.05 level

@ F Not significant at 0.05 level

women students of the arts faculty (APW) and those in the science faculty (SPW).

The attitude scores were further analysed by employing analysis of variance of a 2³ factorial design to find out whether there was any significant influence of the three variables, viz. year of study, sex and faculty, on the attitude of the students towards IA. The results of this analysis presented in Table 2 show that the *F*-ratios were significant in the case of year of study, sex and faculty at or above 0.05 level. None of the two factor- or three-factor interaction effects was significant at 0.05 level.

Table 3
MEAN SCORES AND SEs OF THE Ss CLASSIFIED ACCORDING TO
THE YEAR OF STUDY, SEX AND FACULTY

Group	N	M	SE
Previous	120	130.43***	1.47
Final	120	124.38**	1.62
Men	120	129.90***	1.63
Women	120	124.92***	1.05
Arts	120	125.43**	1.63
Science	120	129.39***	1.47
Whole group	240	127.40***	1.06

*** Difference between the mean and the neutral point significant at 0.001 level.

** Difference between the mean and the neutral point significant at 0.01 level.

The *F*-ratio for the year of study was 6.96, significant at 0.01 level, indicating a significant difference between the first and second year students in their attitude towards the system. From Table 3 it could be seen that the mean score of all the first year students put together was 130.43, while that of the second year was 124.38. This shows that the first year students had a more favourable attitude towards IA compared to those in the second year. The mean scores of the different sub-groups of Ss in the first year were considerably higher than the means of the corresponding sub-groups in the second year (Table 1). It appears, therefore, that the first year students fresh from the undergraduate classes without practical experience with IA think that the new system would be beneficial to them, whereas their counterparts in the second year who have actually undergone the system do not favour it so much. Is this result peculiar to this sample of students? Or, is there a reduction in the attitude of the second year

students by virtue of their experience with the new system? Answers to these questions can be found out if the 120 first year students, who have participated in the study, are followed up and their attitude is measured again when they go to the second year after gaining sufficient experience with the new system of evaluation.

In a similar study conducted by the author in another university college where there is a proposal to introduce internal assessment, at present the traditional type of examinations, being in vogue, similar results, i. e. a significant difference between the attitude of the previous and final students was obtained (Venkata Rami Reddy, *a*). A follow-up study of the previous students when they came to the final year was also conducted. There was a reduction in the attitude score of all the sub-groups. The change was greater in the case of students of the science faculty compared to that in the case of those of the arts faculty. The shift in the attitude from the positive to the negative was more with female students than with male students. This indicates that experience in the university life especially with regard to the way in which their learning is evaluated (though the evaluation is done with traditional type of examinations conducted with many precautions, like getting the question papers set by examiners outside the university area, confidential decoding and double valuation of answer scripts, etc.) tended to make the students suspect the objectivity, honesty and integrity of the teachers (Venkata Rami Reddy, *b*).

The *F*-ratio for sex was 4.60, which is significant at 0.05 level. The mean score of men students was 129.90 while that of women students was 124.92. This indicates that the women students had a significantly less favourable attitude towards IA compared to the men students. These results are not in line with those obtained in another study where it was found that women students had a more favourable attitude towards internal assessment than the men students (Venkata Rami Reddy, *a*). But the above study was conducted in an institution where the examination system is of the traditional type and there is only a proposal to introduce IA shortly.

Does the lower mean score of the female students obtained in the present investigation mean that they do not favour the system so much as there is a greater possibility of their getting teased by the male-dominated teacher community? This view seems to derive support from the follow-up study described earlier (Venkata Rami Reddy, *b*) where the reduction in the attitude scores of students from the first year to the second year was greater in the case of female students than in the case of male students.

The mean score of the Ss in the science faculty was 129.37, while

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that of those in the arts faculty was 125.43. The *F*-ratio was significant at 0.05 level, showing thereby that the science students had a significantly more favourable attitude towards this system than their counterparts in the arts faculty.

The results of the analysis of the responses of the Ss for the two general questions, whether they want IA to be continued or not and the weight to be given to it are presented in Table 4. It could be seen that nearly 70 per cent of the Ss in all the sub-groups expressed that the system should be continued. More number of male students than female students wanted its retention. Greater percentage of those in the science faculty expressed that it should be retained. These results are in line with those that are already discussed. To the question whether IA should be partial

Table 4
PERCENTAGE OF Ss IN THE DIFFERENT SUB-GROUPS WHO WANT RETENTION OF IA AND THOSE WHO DO NOT WANT, AND THE RESULTS OF FURTHER ANALYSIS OF THE RESPONSES OF THOSE WHO PREFER IA, REGARDING THE WEIGHTAGE TO BE GIVEN TO IT

Group	N	% preferring retention of IA	% not preferring retention of IA	Among those who prefer IA, % preferring it for -		
				25% of marks	50% of marks	100% of marks
APM	30	76.67	23.33	26.08	65.21	8.69
APW	30	63.33	36.67	63.15	15.78	21.05
AFM	30	66.67	33.33	40.00	45.00	15.00
AFW	30	53.33	46.67	43.75	50.00	6.25
SPM	30	83.33	16.67	28.00	36.00	36.00
SPW	30	86.67	13.33	30.76	53.84	15.38
SFM	30	86.67	13.33	23.07	61.53	15.38
SFW	30	70.00	30.00	38.09	52.38	9.53
Arts	120	65.00	35.00	42.30	44.87	12.82
Science	120	81.67	18.33	29.59	51.02	19.38
Previous	120	77.50	22.50	35.48	44.08	20.43
Final	120	69.17	30.80	34.93	53.01	12.04
Men	120	78.33	21.67	28.72	52.12	19.14
Women	120	68.33	31.67	42.68	43.90	13.41
Whole group	240	73.33	26.67	35.22	48.29	16.47

A : Arts
S : Science

P : Previous
F : Final

M : Men
W : Women

or complete, nearly 50 per cent of the Ss expressed that it should be only for 50 per cent of marks. Only 10-15 per cent of the Ss wanted complete 1A. The rest felt that it should be for 25 per cent of marks only.

The correlation between the attitude of the Ss towards internal assessment and their mental ability was calculated. The correlation coefficients was found to be $-.05$ for the whole group of 240 Ss. The coefficients for the different sub-groups ranged between $-.011$ and $+.02$ showing that there is no relation between mental ability and attitude towards 1A.

If a scholastic ability standardized to be used on this population were available, it would probably be a better correlate with internal assessment and indicate whether high achievers or low achievers are in favour of 1A.

An examination of the responses of the Ss to the different items in the attitude scale was made to see the salient points, if any. It was found that nearly 50 per cent of the students felt that caste feelings played a role in assessment. As many as 65 per cent of the students expressed that students were getting more interested in Kaka* than in studies. A majority of the students opined that teachers became dictators and used this system as a weapon in their hands. Many felt that those who rendered service to the teachers were marked high, that freedom of the students was lost, even worthless students got promoted, and that departmental politics multiplied. However, only very few (20 per cent) of the Ss expressed that marks could be purchased.

It is gratifying to note, however, that a vast majority (80 per cent) of the Ss felt that in this system they devoted more time to their studies. Many of them expressed that they became more disciplined, and that student agitations decreased.

The pattern that was followed in the institution, where this investigation was conducted, was the academic year, divided into two semesters. At the end of each semester there was an examination, in addition to which two to three mid-semester tests were also held. The weightage given to the mid-semester and end-semester examinations was 40 : 60. There were slight variations from one department to another in these matters. At the end of the fourth semester there was comprehensive viva ; but no comprehensive examination in theory was held. The marks obtained in all the four semesters were added to give the final grade.

The examinations were conducted by the teachers concerned, and the marks were passed on to the Head of the Department. The papers were returned to the students after the valuation and they could go through the mode or marking. If there was any grievance the student could ask

*Kaka is a common term used in this part of the country to mean fawning, cringing or flattering to gain favour.

the teacher, or report to the Departmental Academic Committee or College Academic Committee. However, exchange of papers between students to see whether the same scheme of evaluation was used for all of them was not allowed.

Informal discussions held with teachers and students revealed some important points which may serve as pointers to improve the system. Adequate training in modern methods of evaluation was not provided to the teachers nor were they supplied with question banks. The result was that the questions set were of the old essay-type, with a few short-answer ones. The possibility for exercising bias in valuing the essay-type questions need not be pointed out. Further, as adequate number of text and reference books were not available, the teachers were forced to dictate notes. As the same teacher who teaches, conducts the tests also, the questions set in the examinations were necessarily from the notes lest there should be protests from the students that they were not taught what was asked in the examination. An unfortunate consequence of this state of affairs was falling of standards while the avowed goal of IA was to raise the same. Due to pressures from various forces to boost the marks of some interested candidates, many teachers have remarked that they have lost peace of mind ever since IA was introduced. This seemed to be especially true with the honest and conscientious teachers. Had there been question banks, and the question papers contained more objective type of questions with provision for exchanging papers to verify the objectivity of marking the answers, the situation would have been far better. Supply of multiple copies of textbooks and reference books should have been given top priority (Venkata Rami Reddy, *b* and *c*).

The fact that a majority of the students were in favour of IA for only 50 per cent of marks, is an important point to be noted. If there is a university examination at the end of the year, in addition to periodical IA, it may iron out to some extent the biases in marking the IA. If the correlation between the marks obtained in the IA and the university examination is low and if it is so consistently, a warning may be given to the teacher or department concerned. This may restrain the tendency of the teachers to show biases in evaluation.

It must be pointed out in conclusion that the sample for the study was restricted to one university, because this is the only university selected for trying IA in this part of the country, and only the university college was implementing the new system of evaluation. However, as the sample of students was selected by a multistage stratified random sampling procedure from a large population of about 1,500 students studying in different departments, under different teachers and heads of depart-

ments, hailing from different parts of the State, and belonging to different sections of the society, the sample may be considered to be representative of the population and the results may be applicable to other universities as well. However, similar studies in other institutions where IA is tried have to be conducted to cross-validate the findings. Such studies would throw more light on this ticklish issue.

Further, as the institution in which the investigation was conducted was a co-educational one and, as pointed out earlier, since in no other institution in this region IA was being experimented upon, it was not possible to compare the attitude of the students of co-educational institutions and those of other type of institutions. A study designed to compare the attitude of students of men's colleges, women's colleges and co-educational institutions may help us gain better insight into the problem.

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Evaluation of Selected Picture Story Books Published in India for the Age-Group 4-6 Years

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ASSOCIATION with literature is a fascinating experience. The appreciation and indulgence in literature appears very early in life when a young child begins to unfold the magic and the mysteries of the world by flipping through his favourite story book; feeling its texture and identifying himself with the characters of the story, thus, perceiving a world of his 'own' through the pictures of varied colours and hues... Apart from learning and pleasure, books unlock a unique world of emotion and authenticity which becomes a part of the child's growth—physical, psychic and intellectual—and the combination of which provides an 'environment' in which the child matures.

The field of children's literature, in the twentieth century, has gained its full ground. The growing realization for the need of the books specifically designed for children have inspired many publishers to produce books for children of a wide age-range. In India, most of the story books

*This paper is based on a master's thesis, "Evaluative criteria for the age-group 4 to 6 years", submitted by the first author, under the direction of the second author to the Department of Child Development, M.S. University of Baroda.

for children are based on its rich folklore, mythological and historical themes. Do these books cater to the child's interests, needs and the age requirements? How does one assess or evaluate the quality of a book, produced for a specific age-group? The focus of the present study was to evaluate selected picture story books in English, published in India for the age-group 4-6 years, on the basis of a specific evaluative criteria.

The present study, thus, consisted of two parts. Part I dealt with the formulation of an evaluative criteria for picture story books for the age-group 4-6 years. Part II dealt with the evaluation of selected picture story books, published in India, on the basis of the criteria formulated. This paper deals with the study Part II.

The main objective of the present study was to evaluate the selected picture story books in English, published in India by the sample of K.G. and first grade teachers. The specific objectives were: (a) to select the picture story books produced for the age-group four to six years; (b) to select 40 books, 10 from each of the following categories of picture story books, namely, stories on animals, relating to child's life, adventures, humour and moral.

METHOD

*Sample**

Fourty K.G. and first grade teachers were selected from eight English-medium schools in Baroda. The criteria for selection was their adequate experience in story-telling, using the picture story books.

Selection of the Books

Twenty-eight picture story books in English, on the basis of the specific objectives, and depending upon their availability were selected from seven prominent Indian publishers** of children's literature. Care was taken to select the books written and illustrated by different authors and illustrators.

*The authors wish to express their appreciation to the principals and the K.G. and first grade teachers of the English-medium schools in Baroda, whose help and cooperation made this study possible.

**The authors wish to convey their thanks to the publishers who have been a constant source of motivation behind the present study.

EVALUATION OF SELECTED PICTURE STORY BOOKS

Formulation of Evaluative Criteria

An evaluative criteria was formulated in study Part I on the basis of which the selected picture story books were evaluated. The criteria consisted of five sections, namely, plot, characterization, style, illustrations and format, under which statements concerning the significant aspects of each area were constructed. The criteria was evaluated by the experts and the degree of essentiality per statement in the criteria were determined on a rating scale ranging from most essential, very essential, essential, not very essential and least essential. Table 1 gives the evaluative criteria and the degree of essentiality per statement.

Table 1
EVALUATIVE CRITERIA : DEGREE OF ESSENTIALITY PER STATEMENT

Key—Most Essential ***
Very Essential **
Essential *

1. Is the plot simple ?	.85 ***
2. Can the child readily recognize the plot of the story ?	.78 **
3. Is the plot drawn from the child's life experiences ?	.60 *
4. Do the major events of episodes of the story come alive through the choice of plot ?	.71 **
5. Is the arrangement of the various incidents in the plot such that the story becomes convincing to the child ?	.76 **
6. Does the story sequence move on in such a manner that the interest of the child is sustained throughout ?	.91 ***
7. Is the story line interrupted by too much description or other distracting elements ?	.50 *
8. Are the "actions" built around the theme of the story ?	.72 **
9. Are the "actions" progressive and interrelated ?	.70 **
10. Do the "actions" lead to a climax in the story ?	.64 **
11. Do the "actions" appear in a logical sequence that the conclusion appears a natural outcome ?	.65 **
12. Does the story move along at a rate suitable for its intended age level ?	.87 ***
13. Do the events in the story occur at fast and slow rates to maintain a sense of balance and variation for the child ?	.63 **
14. Does the plot create a feeling of curiosity and suspense in the child's mind ?	.81 ***

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15. Is there a clear-cut and a satisfying conclusion ?	.76 **
16. Does the plot lead the child to a greater understanding of himself and other people ?	.63 **
17. Can an Indian child readily identify himself with the plot, actions, and sequences ?	.73 **
18. Does the plot effectively communicate the ideas of the theme ?	.73 **
19. Does the plot take care of the needs and interests of an Indian child ?	.74 **

CHARACTERIZATION

1. Are the characters precisely described by presenting the major characteristics which the author wants to convey in the story ?	.82 ***
2. Do the characters lend themselves to the child's identification ?	.77 **
3. Do the characters convey the Indian values and cultural background ?	.70 **
4. Do the characters reflect back to children something of themselves so that they feel a part of the story ?	.77 **
5. Do the characters in the story talk and do things typical of the age and the experiences of the child ?	.78 **
6. Do the characters of the story relate to the child's life experiences ?	.63 **
7. Are the characters alive and memorable ?	.81 ***
8. Does each character of the story reflect individuality to provoke additional curiosity and excitements for the child ?	.73 **
9. Has the author been imaginative while depicting each character of the story ?	.94 ***
10. Are the characters life-like and appear real ?	.63 **
11. Can a child acquire self-knowledge and an understanding of life from the characters ?	.57 **
12. Do the characters successfully communicate the message of the story ?	.67 **
13. Can the characters easily be understood by the child ?	.80 **
14. Even though carved out of imagination, are the characters believable ?	.66 **

STYLE

1. Is the language of the text simple ?	.98 ***
2. Is the language used is such that it can easily be understood by the child ?	.95 ***
3. Does the author use the appropriate words to emphasize the theme ?	.87 ***

EVALUATION OF SELECTED PICTURE STORY BOOKS

4. Have the words been used selectively and economically which best reveal the ideas of the story ?	.83 ***
5. Does the language have the power to create a particular mood, the author wants to convey ?	.81 ***
6. Is the style of writing precise, yet stimulating and interesting ?	.91 ***
7. Does the language effectively describe the characters, setting and the plot of the story ?	.78 **
8. Does the language reflect the individuality of the author ?	.47 *
9. Is there a measure of originality in the way the ideas are expressed and the words used ?	.55 *
10. Is the style of writing novel and imaginative ?	.67 **
11. Is the writing orderly and exact ?	.64 **
12. Is the language concise but yet expressive of the theme ?	.74 **
13. Does the language make the message understood ?	.69 **
14. Does the author use simple vocabulary so that the child can identify the words and the content easily ?	.83 ***
15. Do the words make 'exciting sound' to highlight certain expressions in the story ?	.86 ***
16. Do the main expressions of the story come alive through the use of language ?	.81 ***
17. Is the vocabulary of the text simple, yet challenging and impressive for an Indian child ?	.78 **

ILLUSTRATIONS

1. Are the pictures well drawn ?	.89 ***
2. Do the illustrations interpret the story ?	.88 ***
3. Can the illustrations be perceived clearly by the child ?	.84 ***
4. Do the illustrations enhance verbalization ?	.81 ***
5. Are the significant aspects of the story highlighted by bold pictures ?	.80 **
6. Has the illustrator sensitively selected the colour schemes of the illustrations to enhance the appeal of the book ?	.87 ***
7. Can an Indian child easily identify himself with the story in the manner the story has been illustrated ?	.73 **
8. Is the style of presentation (i. e. art medium, designs, colour schemes) consistent in all the illustrations ?	.69 **

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9. Do the illustrations aid in contributing to the books total appeal ?	.84 ***
10. Are the pictures expressive, so that they convey the feelings of the characters (i. e. fear, happiness, sorrow, etc.)	.83 ***
11. Do the illustrations appear life-like and not just still pictures ?	.76 **
12. Are the figures and compositions presented in proportion to each other ?	.62 **
13. Are the illustrations precise enough that they convey the major ideas of the story to the child ?	.79 **
14. Do the illustrations reveal Indian background in the theme ?	.63 **
15. Is the movement of the figures effectively brought out to make them appear more natural and real ?	.67 **
16. Does the individuality of the illustrator come through the pictures ?	.50 *
17. Does the illustrator reflect imaginative thinking in the pictures ?	.60 *
18. Do the illustrations reveal the artist's originality in the manner they appear on the page ?	.53 *

FORMAT

1. Is the cost of the book reasonable enough that an ordinary parent or teacher can afford it ?	.87 ***
2. Is the size of the book such that the child can easily handle it ?	.87 ***
3. Is the finish of the paper refined and smooth to enable the appeal of the book ?	.68 **
4. Is the cover illustration presented such that it spontaneously catches the child's eye ?	.82 ***
5. Is the cover illustration representative of the text ?	.71 **
6. Are the prints bold, so that the child can easily identify each words from the other ?	.92 ***
7. Does the printing aid in emphasizing some words, the author wants to highlight in the story ?	.70 **
8. Is there consistency in the size of the print, to maintain child's constant interest in the book ?	.70 **
9. Is the size of the book such that the content and the illustrations of the book can easily be comprehended by the child ?	.77 **
10. Is the spacing between the words done effectively so that the child can readily differentiate one word from the other ?	.90 ***
11. Is the binding of the book strong and durable ?	.79 **
12. Is the overall finish of the book such that it attracts the child's immediate glance ?	.81 ***
13. Does the book possess the quality of making the child look at it again and again ?	.77 **

EVALUATION OF SELECTED PICTURE STORY BOOKS

Procedure

Each *S* was given a set of five or six books to evaluate. For each book, a separate criteria sheet was used. A five-point rating scale was formulated and the ratings were classified as Excellent, Good, Average, Inadequate and Poor—getting the scores 5, 4, 3, 2 and 1, respectively.

Each subject was asked to *rate each item* (statement) in the criteria sheet on the rating scale (Excellent to Poor) in relation to a particular book being evaluated. *Ss* from one school were given different sets of books to avoid any bias in responses. Each book was evaluated by eight teachers.

RESULTS

Measures derived for analysis were percentage per section per book and grand percentage per book. Ranks per section per book and final rank per book were assigned in the order of the highest to the lowest percentage obtained. The results of the present study are presented in the following manner:

I. Percentages and Ranks per Section per Book

Responses per item per book were tabulated on the rating scale and the numbers multiplied with their respective scores (i.e. 5,4,3,2,1). 'Total' and 'maximum possible' scores with their respective degree of essentiality added separately for each section and divided to determine the 'percentage'. Table 2 is an illustrative table for evaluating a book.

Table 2
ILLUSTRATIVE TABLE FOR EVALUATION OF THE BOOKS

Data analysis per item—Book 1—of teachers 5							
State- ment	Degree of essen- tiality	Teachers' ratings					Scores obtained
		Excellent	Good	Average	Adequate	Poor	
1.	.7	5	8	3	2	—	12.6
2.	.6	10	4	3	2	—	11.4
Scores obtained					$12.6 + 11.4 = 24.0$		
Maximum scores obtained					$25 \times .7 + 25 \times .6$		
					$= 17.5 + 15.0$		
					$= 32.5$		
Percentage					$= \frac{24}{32.5} \times 100$		
					$= 73.8$		

Table 3
PERCENTAGES, GRAND PERCENTAGES AND FINAL RANKS PER BOOK

No. of books	Plot		Characterization		Style		Illustrations		Format		Grand %	Final Ranks
	%	Grand %	%	Grand %	%	Grand %	%	Grand %	%	Grand %		
1.	a	b	a	b	a	b	a	b	a	b	74.89	13
2.	73.91	14.78	81.42	16.28	73.26	13.19	73.43	21.29	71.92	9.35	69.62	19
3.	75.32	15.06	72.78	14.56	63.53	11.14	73.45	21.30	55.87	7.26	79.23	8
4.	80.68	16.14	76.42	15.28	78.24	14.08	73.45	23.61	77.86	10.12	79.83	6
5.	81.98	16.39	79.25	15.85	74.92	13.49	85.02	24.66	72.63	9.44	65.54	24
6.	69.05	13.81	68.49	13.09	63.21	11.38	62.99	18.26	64.63	8.40	72.51	15
7.	70.75	14.15	78.49	15.69	64.07	11.53	74.31	21.25	73.81	9.56	87.00	1
8.	87.19	17.44	89.37	17.87	87.58	15.76	85.21	24.71	86.28	11.22	68.72	20
9.	66.81	13.36	63.13	12.63	73.05	13.15	71.04	20.60	69.08	8.98	65.76	23
10.	68.33	13.67	65.13	13.03	66.15	11.91	62.85	18.23	68.86	8.92	67.33	22
11.	70.53	14.11	68.83	13.77	64.74	11.60	63.34	18.37	72.89	9.48	77.79	10
12.	78.29	15.66	81.75	16.35	77.11	13.88	77.19	22.39	73.18	9.51	68.47	21
13.	61.51	12.90	65.97	23.19	63.89	11.50	75.63	21.98	76.43	9.55	70.81	18
14.	68.25	13.65	69.17	13.83	68.54	12.34	74.39	21.57	72.47	9.42	78.22	9
15.	78.19	15.64	81.30	16.26	80.40	14.47	76.50	22.19	74.28	9.66	58.62	26
16.	65.49	13.09	62.56	12.51	54.85	9.87	52.35	15.18	60.57	7.87	53.35	28
17.	51.43	10.29	51.90	10.38	44.76	8.06	60.61	17.57	54.26	7.05	59.35	25
18.	64.13	12.83	68.83	13.77	49.88	8.99	58.05	16.83	53.32	6.93	54.61	27
19.	59.78	11.95	58.74	11.75	51.66	9.29	52.53	15.23	49.22	6.39	83.13	2
20.	81.89	16.37	84.69	16.94	80.90	14.56	85.10	24.68	81.39	10.58	83.05	3
21.	85.07	17.01	80.27	16.05	83.83	15.09	86.94	24.78	77.80	10.11	77.16	11
22.	80.69	16.14	77.08	15.42	76.73	13.82	76.94	22.31	72.82	9.47	72.60	14
23.	70.79	14.16	70.05	14.01	68.72	12.37	76.53	22.19	75.96	9.87	80.50	4
24.	84.86	16.97	74.32	14.86	76.39	13.75	87.01	25.23	74.53	9.69	79.26	7
25.	83.94	16.79	83.95	16.79	76.91	13.84	75.23	21.52	77.04	10.02	71.80	16
26.	71.76	14.35	66.10	13.22	74.24	13.36	75.84	21.99	68.34	8.88	71.38	17
27.	78.70	15.74	73.17	14.63	63.85	11.49	71.40	20.71	67.77	8.81	76.81	12
28.	78.06	15.61	78.55	15.71	81.35	14.64	70.94	20.57	77.71	10.10	80.15	5
	84.89	16.98	70.19	14.04	77.08	13.87	85.29	24.73	80.97	10.53		

EVALUATION OF SELECTED PICTURE STORY BOOKS

Percentages per section per book were tabulated and assigned the ranks. The purpose being to compare the ratings obtained on each section of a book. Table 3 gives the percentages obtained per section per book. (See column a)

Results revealed that percentages obtained on all the books ranged from 44.76% to 89.37%. The range of classification of the ratings, i.e. from Poor to Excellent, corresponding with the scores obtained, were: Poor 0% to 20%; Inadequate 20% to 40%; Average 40% to 60%; Good 60% to 80% and Excellent being 80% to 100%. Thus all the books were rated within the range of Average to Excellent categories while the majority of the books rating as 'good' under each section. Book 7 consistently obtained the highest percentage in all the sections except illustrations. The trend of percentages obtained on each section per book tended to be approximately within the range of 10% to 15% variability.

Grand Percentage and Final Rank per Book

Percentages per section per book were multiplied with the weightage in percentage given to each section by the experts in study Part I, and added to determine the grand percentage. The final rank was assigned subsequently. Table 4 gives the weightage in percentage per section and Table 3 gives grand percentage and final rank per book. (See column b)

Table 4
WEIGHTAGE IN PERCENTAGE PER SECTION

<i>Plot</i>	<i>Characterization</i>	<i>Style</i>	<i>Illustration</i>	<i>Format</i>
20	20	18	29	13

The range of grand percentage obtained for all the books fell between 87% (7 books, and 53.35% (16 books). All the books evaluated fell into the categories of Excellent to Average. From the 28 books selected for the study, five books rated Excellent, 19 books Good and four books rated Average. The results of the present study highlighted two more findings: (a) The percentages and ranks obtained on a set of books from one publisher tended to fall within the range of 10% to 15% variability, (b) From the 28 books evaluated, more number of books obtained *higher percentages on the sections plot and characterization*. On an average, books tended to

rate comparatively lower on the sections *illustrations, style and format.*

DISCUSSION

The discussion of the present study centres around the major findings revealed from the results, leading simultaneously to its interpretations.

The main finding has indicated that all the books selected from the Indian publishers have fallen into Excellent to Average categories, while the majority being in Good category. However, a set of books from one publisher, when looked at individually, do not rate approximately consistent in all the areas, i.e. plot, characterization, illustrations, etc. Some books which may rate excellent in plot or characterization, may obtain comparatively lower ratings for its illustrations, style or format resulting in greater variability and vice versa.

The results also highlight the fact that books on an average published in India, rate comparatively lower in the areas of style, illustrations and format than in plot and characterization. In a picture story book, illustrations form the most important aspect and style and format too hold their significance (Arbuthnot, 1964; Georgion, 1969 and suggested by experts in study Part I) therefore, these three areas need to be given considerable attention by the illustrators, authors and publishers of children's literature. Purie (1971) revealing the underlying problems faced by the publishers states :

In order to be attractive, children's books need to be profusely illustrated. This requires high quality colour reproduction, which in turn requires a paper of above average quality. All this adds up to high initial costs, which prevents many publishers from entering this field (p.251).

Format is one area which suffers the most due to the fundamental shortcomings in the production of books. Most of the books have tended to rate low for their format, specially on the aspects like the durability of the book, strong binding, quality of paper, etc. Goradia (1976) expressing her views on this fact asserts :

Technically it is possible to publish superior quality books. But the publishers face many problems like shortage and high price of good paper and sophisticated offset printing processes. There is not much profit, hence publishing houses prefer to cater to the institutional

markets, schools and libraries, supplying text and recommended material (p. 4).

Despite these problems faced by the publishers under present conditions, books, on an average, have fared well, with a few exceptions, e.g. *Rupa the Elephant*, *Mihu and Mithi*, *Bhondoo the Barber*, *Ravi and Gappu* and *A Silly Trick*, which are excellent and are heartily enjoyed by the children. The colourful 'fantasy' in *Rupa*, the 'belly laugh sneeze' of the king in *Mihu and Mithi*, the 'rollicking humour' created by Bhondoo the monkey and a moral in a simple way conveyed in *A Silly Trick* come alive through their well-knit plot, interesting characters, excellent use of words, having 'exciting sounds' and colourful and bold illustrations expressing the mood and the feeling of the characters! The themes selected for these books are of universal and abiding interest to children. Animal adventures, friendship and love between animal and humans, child's love for his pet, mother-child affection, and brother-sister sharing a common experience are the usual themes for most of the picture story books.

From the 28 books selected in the study, 20 had animal themes. Eight books were pure animal stories, six related to child's life, six on humour, six on an adventure and three books were on moral themes. There is, inevitably, an abundance of animal picture story books, but the variety in terms of stories relating to child's life, fantasy, imagination and realism lag far behind. According to Verma (1970) :

India has an abundant wealth of mythological stories, fables, legends and folk tales; lately considerable efforts have been made to publish books for children, based on this rich cultural heritage of ours (p. 19). Towards this step to advancement, we also need to have more original stories, pure fun and fantasy which would instinctively delight the child. This step, it is hoped, would add a new dimension to the field of children's literature in India.

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CORRECTION

In April 1978 issue of *Indian Educational Review*, we carried an article entitled "Evolution of an Instructional Strategy for Teaching Educational Evaluation" by M.S. Yadav, case, University of Baroda. Due to oversight the name of its co-author, R. Govinda, Institute of Social and Economic Change, Bangalore, was omitted in the article. The omission is regretted.

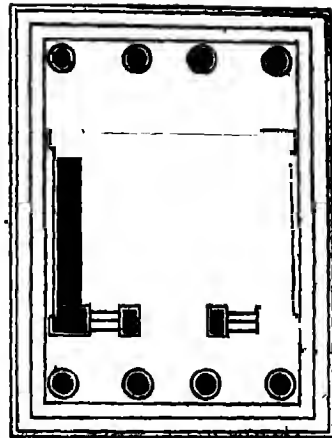
—General Editor

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Interest, Aptitude and Personality Factors as Predictors of Scholastic Achievement

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THE Secondary Education Commission (1952-53) had suggested a diversity of educational programmes—the seven diversified courses—in secondary schools to meet the varying abilities, interests and talents of students because they differ greatly in these, especially around adolescence, i.e. about 14+. A proper selection of students for the diversified courses in accordance with differences in student nature, and the prediction of their scholastic achievements in these courses prior to their admission are the twin problems before us. The solution of these problems will arrest much of the wastage and stagnation in our secondary education.

Recently (1960) Burt, Vernon, Eysenck, etc. have proposed a shorter battery of differential scholastic aptitudes to measure almost the whole area of intellective ability and have shown that the tests of personality and interest when combined with the knowledge of a student's intellectual ability made prediction considerably more accurate. Therefore, only N, V, IR and DR factor tests from Varma's battery of differential scholastic aptitudes, are selected to measure cognitive abilities. An interest inventory in which curricular activities from both humanities and science courses are grouped in 20 boxes of five items each, is constructed on the lines of the Devon interest test. Neurotic tendency or emotional stability and 'confidence in oneself' are the two traits of personality selected from the

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six traits measured by Bernreuter's personality test which has been translated into Marathi with the permission of the author.

The eight tests of the battery are administered to 640 students of Class IX in 12 secondary schools of Vidarbha. The criterion—scaled average of school marks in all the optional subjects of humanities or science of Class IX—though fallible, has to be used. The eight variables are factorized firstly by the centroid method and four factors are extracted. They are : general scholastic temperament, a general power factor with a dichotomy of science and humanities interest, 'personality (non-intellective)' factor which contrasts the non-intellective dynamic side of mind with the intellective functions and formation of interests; 'interest (acquired or curricular)' factor, and the 'weaker' factor. The four centroid factors are rotated by the Varimax method of rotation. The first rotated factor is general scholastic ability with the highest positive loadings of cognitive abilities on it. Unlike the centroid first factor this general power factor appears to be an ability factor with negative loading of humanities interest on it. The second and third rotated factors are personality (non-intellective) and interest (curricular), respectively, as the initial centroid factors. The fourth factor is clearer in the Varimax solution and possesses larger positive loadings of *v* and *DR* abilities on it and thus is the verbal or linguistic factor. When factor variances of all the factors are considered together, general scholastic ability accounts for 68 per cent, personality (non-intellective) 22 per cent and interest (curricular or acquired) for nearly 9 per cent of the total variance contributed by them to the variables of the battery.

The most likely measurement in the criterion from the known measurements on the eight variables is predicted with the help of a regression on equation. Regression helps us to predict the most likely measurement in one variable from the known measurements in the other. Regression coefficients are calculated by the inverse matrix method. Regression weights for the variables on the two criteria are determined. Besides the β weights, optimal or effective weights, i.e. proportions of the total variance of the battery contributed by variables are calculated for the variables. When the variance contributed by our essay examinations with its huge burden to subsequent achievement for prediction purposes ranges between 25 to 30 per cent the variances contributed by the battery to humanities and science achievements are above 36 per cent, i.e.

$$6^2 \text{ Sc.} = 36.705\% \text{ and } 6^2 \text{ Hu.} = 36.16\%$$

Moreover, the battery develops optimal differentiation among the two courses of study and the differential measurements are predicted from the regression equations.

Because the present selection of students for diversified courses is un-

scientific and results in colossal wastage and stagnation of human talents, students with better promise for scholastic pursuits are selected from the sample after applying cut-off scores to the composite of the scores on the eight variables of battery in the two courses. The Directorate of Manpower, Government of India, in its recent survey has reported that the percentage of failures and dropouts in secondary education is 76 per cent. This indicates that only 24 per cent students come out of secondary stage successfully and can be called as the normally successful group of students.

Discriminant function (Fisher, 1936) solves the problems of discriminating between different populations and classifying them properly. The α value from the scaled scores on the eight tests of the predictive battery for science is -1.15 and that for humanities comes out to be -1.57 . The critical point for the function α for the two courses of study is thus $-.21$. If the U value obtained by a student is below $-.21$ he is to be admitted into humanities course while, if it is above $-.21$ he is to be assigned to α the science course. The analysis of variance of α between and within groups establishes the relative value of the variable α for discriminating between the two courses of study with the help of scaled scores of students on the eight predictor variables of the battery.

Thus, this battery of eight variables offers a single classification battery which, by means of differential weighting procedures, enables us to measure differentially scholastic developments and predict, from the scores on variables at the beginning of secondary schooling, the scholastic achievements at the end of Class IX of students offering humanities and science courses in secondary schools.



Development and Tryout of Auto-Instructional Programmes for Class VIII

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INTRODUCTION

A NEW syllabus in algebra and geometry has been introduced in secondary schools of Gujarat since 1973-1974 gradually from Class VIII. Some new concepts in algebra and geometry have been introduced and as a result of this, the subject has become more popular in students' world as well as in society as the modern mathematics. While the State Department of Education, Gujarat, decided to switch over to the modern mathematics, the headmasters, managements, parents and the persons concerned with education were much worried about the satisfactory teaching of this subject because teachers were not properly equipped with the content, as well as the approach of teaching modern mathematics. This situation has still not improved up to the desired level for one or the other reasons. Besides, the government has taken over the publication of textbooks for primary, secondary and higher schools. Therefore, there is only one book in each subject prepared and published by the Textbook Board of Gujarat State. Only the textbook in the subject may not satisfy the students and teachers, from the viewpoint approaches of teaching, illustrations and exercises have to be given for drilling the theory taught in the classroom. Over and above this, the students don't get any material for learning the subject at home except textbooks and notes given by teachers. One cannot deny the fact that the PLM should be placed in the hands of students and teachers at large. Therefore, it is in this context that the present problem of development and tryout of the auto-instructional programmes in some units of geometry for Class VIII and to study its effectiveness in the context of different variables, have been taken up with the following objectives in view.

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OBJECTIVES

1. To develop PLM in some units of geometry for Class VIII.
2. To develop the achievement in mathematics of students learning through PLM and traditional way of teaching.
3. To compare the achievement in mathematics of students having good reading ability and learning through PLM and traditional way of teaching.
4. To compare the achievement in mathematics of pupils having poor reading ability and teaching through PLM and traditional way of teaching.
5. To compare the achievement in mathematics of students having poor study habits and learning through PLM and traditional way of teaching.
6. To compare the achievement in mathematics of students having good habits and learning through PLM and traditional way of teaching.
7. To compare the achievement in mathematics of students who are more anxious and learning through PLM and traditional way of teaching.
8. To compare the achievement in mathematics of students who are less anxious and learning through PLM and traditional way of teaching.
9. To compare the achievement in mathematics of students having high n ach. learning through PLM and traditional way of teaching.
10. To compare the achievement in mathematics of students having low n ach. and learning through PLM and traditional way of teaching.

EXPERIMENTAL DESIGN

From the beginning of this research it was decided to carry out the research in two phases, namely, (i) the development and validation of auto-instructional programme, and (ii) the study of its correctness in the context of different variable which is, by and large, an experimental type of study. Accordingly, the first phase of planning, developing and validating the auto-instructional material have been described and discussed at length in the thesis. Any meaningful study required a great deal of thought for setting a design. More so, when it happens to be experimental in nature. Setting and experimental design demand the formulation of good hypotheses and the objectives of the study. Thus the scrutiny of the objectives stated in the beginning of this report helped the investigator to formulate the null-hypotheses.

FORMULATION OF HYPOTHESES

In order to make the research more scientific it is essential to formulate the hypotheses with utmost care and caution. No scientific undertaking can proceed without effecting well conceived hypotheses. Without hypotheses, the research is unfocused, haphazard and accidental. Hence the following operational null-hypotheses were formulated with a view to verifying them satisfactorily with the help of statistical techniques.

Null-hypotheses

1. There will be no mean difference between the scores achieved by pupils learning geometry through programmed learning approach and those learning through conventional method of teaching geometry.

2. There will be no difference between the mean scores on the post-test in geometry given to pupils of Class VIII falling in the upper quartile (Q_3) of n ach. distribution score, when they learnt geometry through PLM and pupils falling in the same quartile (R_1) of the n ach. distribution but learnt geometry through PLM and pupils falling in the same quartile (R_3) of the n ach. distribution but learnt geometry through conventional method.

3. There will be no difference between the mean scores on the post-test in geometry given to pupils of Class VIII, falling in the lower quartile (R_1) of the n ach. distribution when they learnt through PLM and the pupils falling in the same quartile (Q_1) of the n ach. distribution but learnt geometry through conventional method.

4. There will be no difference between the mean scores of the post-test in geometry given to pupils falling in the upper quartile (Q_3) of study habits distribution when they learnt geometry through PLM and the pupils falling in the same quartile (R_3) of study habits distribution but learnt geometry through conventional method.

5. There will be no difference between the mean scores on the post-test in geometry given to pupils falling in the lower quartile (Q_1) of the study habits distribution when they learnt geometry through PLM and pupils falling in the same quartile (Q_1) of the study habits distribution but learnt geometry through conventional method.

6. There will be no difference between the mean scores on the post-test in geometry given to pupils falling in the upper quartile (Q_3) of the reading ability distribution when they learnt geometry through conventional method.

7. There will be no difference between the mean scores on the post-test in geometry given to pupils falling in the lower quartile (Q_1) of the reading ability distribution when they learnt geometry through PLM and pupils falling in the same quartile (Q_1) of the reading ability distribution but learnt geometry through conventional method.

8. There will be no difference between the mean scores on post-test in geometry given to pupils falling in the upper quartile (Q_3) of the anxiety distribution when they learnt geometry through PLM and pupils falling in the same quartile (Q_3) of the anxiety distribution but learnt geometry through conventional method.

9. There will be no difference between the mean scores on the post-test in geometry given to pupils falling in the lower quartile (Q_1) of the anxiety distribution when they learnt geometry through PLM and pupils falling in the same quartile but learnt geometry through conventional method.

The hypotheses thus formulated have guided the investigator in selecting an appropriate method of experimentation. For this, the investigator had to go through different methods of experimentation. In the field of education the three methods used are : (i) one group method, (ii) parallel or equivalent group method, and (iii) rotational group method. Out of these three methods, the second method—equivalent group method—is widely used because it is through this method that certain variables could be controlled satisfactorily. Before describing the actual steps of the method it would be in the fitness of the things to consider the basic requirements of the experiment.

Sample of Schools

The selection of sample of schools is a crucial step in the experimental type of research. Hence, it was decided to select schools in such a way that a representative sample of pupils studying in Class VIII of secondary schools could be procured for the purpose to arrive at reliable and valid conclusions. Therefore, schools in Katra district were selected keeping in view the following criteria : (i) the strength of the school, (ii) the area in which the school is located, whether rural, urban etc., (iii) type of school, whether boy's, girl's or mixed school, and (iv) SSCB results.

Fourteen schools were selected in such a way that seven pairs could be matched for the criteria mentioned earlier. The students studying in these schools could be considered as representative sample as well as randomized sample, for, it was found from the informal oral talk with the headmasters of these schools that the students are generally admitted in the schools on the 'first-come-first-served' basis. There is no selection

criteria formulated by the schools for the pupils to be admitted except that they must have passed the annual examination of the previous class. At the same time, it was also thrashed out from the talk that there are no definite criteria for the formation of divisions of Class VIII.

The sample could also be treated as representative of the total population for the reason that the primary and secondary education in the state of Gujarat is free. As a result of this the children of all strata of the society come to schools. The Class VIII being the first year of secondary stage, the people of the lower strata of the society are also tempted to send their children to schools as a token of status. Under such circumstances, the pupils of Class VIII belong to different castes and sub-castes of all religions, of all income groups, and of both sexes of varying abilities.

Formation of Equivalent Groups

The experimental method of the equivalent group was contemplated with a view to testing the hypotheses described in this paper in the beginning. For the formation of equivalent groups, initially 810 students of 18 classes of 18 schools were administered the teacher-made test in mathematics based on the teaching points of mathematics syllabus of Class VII. On the basis of the scores of this test, the classes were matched for mean and standard deviation. Out of 18 classes 14 could be matched easily. These 14 classes were grouped into seven pairs of equivalent groups. In each pair of the equivalent group, one group was treated as the control group while the other was treated as the experimental group.

FINDINGS AND OBSERVATIONS

N Ach. and Achievements through PLMs

The students with low *n ach.* score gained more on the post-test. The mean difference of 2.72 is in favour of control groups of schools on further testing was found to be significant at .05 levels. Therefore, it can be concluded that the students having low *n ach.* and learning geometry through PLM are not found superior in achievement than their counterparts. Thus auto-instructional programme does not work well with the pupils having low *n ach.*

In case of the highly motivated students, the PLM material is found to

be working well, for, the mean achievement of the experimental group is high and is significant. Therefore, the AIM works well only with the students having high n ach.

Study Habits and Achievement on PLMs

Study two indicates that the students with good study habits and taught through auto-instructional programmes have proved themselves superior in achievement to the students having good study habits and taught by the traditional method. Thus, auto-instructional programmes are found to be more effective than the traditional classroom teaching method for the students having good study habits.

The mean achievement of students having poor study habits, both from the experimental and control schools, on the post-test was compared with a view to seeing whether poor study habits are detrimental to learning through AIM. The mean difference of these groups is highly significant which led to the conclusion that the students having poor study habits are also benefitted quite satisfactorily in learning through auto-instructional programme. Thus the learning through AIM is even found effective in case of students having poor study habits.

Reading Ability and Achievement through PLMs

From study 3 it could be concluded safely that students having poor reading ability have not achieved significantly more through PLM, than the students having poor reading ability and learning geometry through conventional method. Therefore, learning through auto-instructional programme in case of students having poor reading ability is not more effective than learning through conventional method of teaching in case of students having poor reading ability. This study also led to conclusion that the students having high reading ability do achieve more through programmed learning than the students having high reading ability and learning through conventional method.

Anxiety and Achievement on PLMs

The study finds that the mean achievement in geometry of students having high anxiety belonging to experimental and control schools revealed the mean difference of 9.1 which is again in favour of students

of experimental group of school having high anxiety. The mean difference in scores is highly significant at 1/88 df at 0.01 level. Thus the more anxious students could learn better through PLM than their counterparts.

The mean achievement in the post-test of students having low anxiety of experimental and control groups of schools was also compared with a view to seeing whether it supports the previous findings. The mean difference of these groups is highly significant which led to the conclusion that the students having low anxiety are benefitted quite satisfactorily by learning through programmed learning material. This finding is supported by the result of Bossett and Lieth (1967), Davis and Lieth (1968), Leith and Davis (1969), Trown and Leith (1970). The findings of these studies showed that anxious subjects were better in performance on a programmed learning material than non-anxious subjects.

Programmed Learning vis-a-vis Traditional Teaching

The study shows that the students of experimental group of schools are benefitted more through programmed learning strategy than their counterparts. The difference in scores is highly significant. Therefore, it is concluded that the PLM is effective than the conventional method of teaching mathematics. This finding is supported by the results of Hughes and McNamara (1961), Hough (1962), Ripple (1963), James Hartly (1966), Sharma (1965), Desai (1966), Sharma (1968), Shah (1969), Mathur (1970), Kulkarni (1968), and Mullick (1968). But, Fleshusen and his collaborators (1962), Smith (1962), and Sharma (1966), could not find any significant difference between the traditional group and programmed group.

Entering Behaviour Score and Terminal Test Score on PLMs

The students having high entering behaviour scores in experimental schools have shown better performance on the post-test than the students having high entering behaviour scores in the control schools. Similarly, the students having low entering behaviour scores in the experimental schools have achieved more on the post-test than the students having low entering behaviour scores in the control schools. Thus, the programmed learning strategy has proved to be effective in case of students having high and low entering behaviour.

Programmed Learning and Duration of Time

To see whether the students learning through programmed learning strategy take more time than the students learning through conventional method, Study 7 was carried out. This study concluded that the students of the experimental group of schools could complete all the units in less time than the students of the control group of schools. Thus the students of the experimental schools could learn the same amount of material in less time than the students of the control schools. the programmed learning strategy when implemented in its right spirit could help the teacher and students to save time and the time thus saved could be utilized in some more fruitful work.

The investigator also made certain observations during the treatment period which are given below.

1. During the tryout period it was observed that the students learning through programmed strategy were eager to know about the purpose of this programmed learning method. In the beginning many students were of the opinion that mathematics cannot be learnt through this programmed learning method strategy. From this observation during pilot work it was decided to give them practice in this new approach by using the programmes on some units in mathematics for Class VIII, by the investigator.

2. Before implementing this programmed learning material on students, the teachers of the experimental group of schools were invited for giving them some understanding about the work to be done. During the discussion about the work to be done the teachers constantly opposed this new idea as they had no faith in the new approach, but the investigator convinced them after citing a number of experimental findings of the past studies. This facilitated the work of the investigator at the time of the final implementation of the programmed learning material on the students of experimental group of schools. The investigator had also observed that at the beginning of the experiment the headmasters of the experimental schools had also no faith in this innovative approach of teaching, but when the results of the groups were communicated to them all were happy and of the opinion that such materials should be made available to schools, so that the teachers could use them, as and when needed.

3. The students of the experimental schools also showed greater interest after taking two or three programmes. They also discussed certain points about the programme with the teachers in-charge and gradually realized the importance of feedback mechanism.

4. The marks that they got on the test after completing each unit really encouraged them for better study. At the same time it was also ob-

served that there was an element of healthy competition amongst the students of the class. This showed that the students gave whole-hearted cooperation in the experiment.

5. It was observed that the bright students were also able to finish the programme earlier than the below normal students.

6. The teachers of the experimental schools reported to the investigator that some of the parents showed interest in the innovative approach.

7. Students of the experimental schools were also asking the teachers whether the PLM in other school subjects are available. Will they give PLM in other school subjects too? This shows that students took great interest in the PLM.

8. In the beginning, it was observed that some of the students wrote answers of the frames without making any effort as the answers of the plates were given on the back, these students were given an advice not to see the answers given at the back of the frame plate, and they were asked to work honestly. As a result of this advice it was observed that the students worked honestly later on.

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Achievement Motivation, School Performance and Educational Norms of Secondary School Pupils

PRATIBHA ARVIND PARIKH

SIGNIFICANCE

TODAY what is going on in the nation's expanding school system in the matter of quality of teaching and learning is a matter of serious concern. The problem poses one of the most threatening challenges to our educational administrators, planners and classroom teachers. Day after day the cycle of teaching and learning goes on in our schools. Planners spend crores of rupees on improving educational system. Twenty-seven years have passed since the country achieved independence and still secondary education remains the weakest link in Indian educational system in several respects. The pursuit of excellence has become a matter of remote chance when even the minimum adequate standards could not be maintained.

Improvement of educational system has, therefore, become a major task of topmost priority. Quite a number of studies have started in the area of classroom teaching, teacher behaviour and pupils' motivation. All these researches by Phillip Jackson, Herbert Thalen, Ned Flenders, Atkinson and McClelland conveyed to us a need for looking into the pupils' mental power minutely. Whatever teaching we do, whatever learning we assume, much will depend upon pupils' motivation to learn. Therefore, the investigator tried the problem :

A study of the achievement motivation, school performance and educational norms of secondary school pupils of standards VIII, IX and X (studying through Gujarati and English as media of instruction) in the city of Bombay.

OBJECTIVES OF THE STUDY

The present study was undertaken with the following major objectives :

* Thesis submitted to the University of Bombay.

1. To determine the level of achievement motive (n ach.) of high school pupils of Bombay city.
2. To study the achievement motivation level of the pupils in each of the components of achievement motive.
3. To study the educational norms, as mirrored through pupils' responses, such as pupils' beliefs about studies, their perception of peers, teachers and parents and their conditioned responses.
4. To study pupils' anxiety level and the level of motivation towards school.
5. To find out the level of academic performance of high achievement motive pupils and low achievement motive pupils. Thus to know the level of achievement motive of the pupils and its relation with pupils' school performance.

HYPOTHESES

Bombay is one of the largest cities of India. It is connected with other nations through air and sea. It has provided the nation with the leadership in industry and business and other walks of life. It has also provided the leadership in the field of education. All these factors lead one to believe that Bombay city is enterprising and achieving. According to the theory of motivation, the students of the city must have high achievement motive.

Bombay is a cosmopolitan city. We find people of different castes, religion and of different nationality all over Bombay. The investigator has been staying in this city for the last six years and she has observed a few of the characteristics of the people. Apparently, the pupils are supposed to get equal facilities for education. However, the pupils have their own limitations like accommodation, income, transport, etc. Many of them are staying in one or two-room tenements. Not only that, the rooms are situated in a very congested locality. Many of them have to travel over long distances from their residence to their place of studies. Due to these adverse factors, the pupils have a tendency to strive for better life. Is it striving for task-related work? Or is it achievement related work? Or is it just striving?

On the basis of all these observations, experiences and questions, the following few hypotheses were laid down to study the achievement motivation level of pupils.

1. The achievement motivation score of the pupils of Bombay city is

higher than that of the pupils in Delhi, Madras and Gujarat schools.

2. The achievement motivation score of boys is higher than that of girls.
3. High achieving schools generally have pupils with high achievement motivation scores.
4. The pupils of middle socio-economic status group will have high achievement motivation score.
5. Achievement motivation score is positively related to pupils' school performance.
6. Pupils having high achievement motivation scores generally give more achievement-related responses.
7. Pupils having high achievement scores generally perceive a greater number of achievement-related qualities in their parents, teachers and peers.
8. Pupils' school performance is negatively related to pupils' anxiety.
9. The pupils in the city of Bombay have high junior index of motivation score.

PROCEDURE

The following procedure was adopted for the study. The entire procedure has been classified under four major setps : (i) Selection and preparation of tools, (ii) Sample, (iii) Data collection, and (iv) Analysis of data.

Selection and Preparation of Tools

Tools are the means for conducting the research and not the ends in themselves. But they being the most effective variables, have their own importance in the researches. After proper care and study, the following tools were selected for the pupose.

(i) TAT PICTURES : The term 'achievement motive' refers to the need for achievement. Motives are conceived as latent disposition to strive for a particular goal, state or aim, e. g. achievement, affiliation or power. As motives are latent dispositions, they can be inferred from the thought sample.

Thus, it can be said that motives are different patterns of thought associated with different goals. Achievement motives can be inferred from the achievement thoughts. Achievement thoughts are those thoughts

associated with striving for some kind of excellence as opposed to the thoughts associated with gaining prestige or with establishing friendly relationship.

The tool (TAT) selected for the present study consists of four pictures each having 53 cms. × 56 cms. size. The picture cues are as follows :

1. A boy learning the tabla from his teacher.
2. A boy reading a book sitting on a cot.
3. A group of boys playing cricket.
4. A boy painting a picture.

The picture test is a group test and it has been found valid and reliable for Indian pupils. The pupils are required to observe a picture for 20 seconds and then to write a story on it for four minutes. In this way, the pupils are expected to write four stories based on four different pictures, i.e. one for each picture.

(ii) JIM SCALE (JUNIOR INDEX OF MOTIVATION) : It is constructed by Prof. Jack R. Frymer. It consists of 80 agree-disagree items. The instrument is designed to measure academic motivation. It contains six major factors.

(iii) SES (SOCIO-ECONOMIC STATUS SCALE) : The scale is constructed by B. Kuppaswami. The scale measures the socio-economic status of the children. It consists of three categories : education, occupation and income.

(iv) BELIEF SCALE : The tool of belief scale consists of ten incomplete statements. Each of these statements is followed by a few opinions. The pupils have to select one opinion for the incomplete statement. Thus they have to write down the serial number of opinion with which they entirely agree. Out of four opinions, one or two are related to the terms of achievement forces.

(v) INVENTORY OF QUALITIES : The tool is constructed by Prayag Mehta. The inventory contains three sections—one each for friends, teachers and parents. Each section contains five items, each of which shows a pair of qualities, apparently comparable on social desirability. The inventory, therefore, contains 15 pairs of qualities, five each for friends, teachers and parents. One quality in each pair is an achievement related quality. The respondents are required to check one quality in each pair. The score ranges from 0 to 5 each for friends, teachers and parents.

(vi) GASC (GENERAL ANXIETY SCALE FOR CHILDREN) : The scales are originally constructed by Sarason. It is adopted by Mrs. Nijhavan for the

Indian children to measure general anxiety in children. The scale GASC includes 45 items measuring the general anxiety of the children.

Sample

The present study was confined to a sample of the pupils studying in Standard VIII, IX and X of the Bombay city. It is confined only to secondary schools, teaching through the media of Gujarati and English. About 1,100 pupils from schools selected at random in Bombay city were administered TAT test on motivation along with other tests. By administering TAT test, one can get the idea of various components in the minds of the pupils. It is quite worthwhile to study the various components in the minds of the pupils as McClelland, Mehta and Desai studied achievement component in various sub-cultures. If we know the absence of components in cultures, it serves as a diagnostic purpose. The investigator selected 1,100 pupils of 30 classes for administering the tests. One of the ideas of the investigation was to compare the achievement motivation components in school pupil population of Bombay city with the pupil population of Rajasthan, Baroda, Kaira, etc.

System of Data Collection

For data collection a time schedule was prepared and all the six tools described earlier were administered personally by the investigator over the selected sample for the purpose. At schools which the investigator visited, she was introduced to the pupils of respective classes as a research student interested in educational researches. The headmaster requested pupils to follow the instructions carefully and to feel free to write their responses sincerely on all the tools. After this preliminary introduction the investigator administered the tools. The tools were administered one by one with sufficient time-gap between two successive administration. The tools were administered and scored. For the schools performance of the pupils the investigator had given tools, she noted down their total marks of last annual examination. These marks were then converted into percentage and according to the following key it was converted in grades :

71 and above	: 1
61 to 70	: 2
51 to 60	: 3
41 to 50	: 4

System of Data Analysis

The present study is a descriptive study, involving the independent variable, namely, sex, religion, age, socio-economic status and five sets of dependent variables measured in terms of achievement motivation (*n ach.*), self-concept (junior index of motivation), belief scale, perception (inventory of qualities), anxiety (general anxiety scale for children). This data has been collected from 1,100 students. The analysis has been done with the help of descriptive statistics like mean, standard deviation, product moment, correlation and test for significance of difference between means in the following order :

1. The master correlation matrix.
2. Achievement motivation and independent variables.
3. JIM and independent variables.
4. Belief scale and independent variables.
5. Perception and independent variables.
6. Anxiety and independent variables.
7. Analysis of covariance and multiple regression was done to study the effect of some variables on performance.
8. Frequency distribution, percentage, and ranges were also calculated.

FINDINGS

1. *n ach.* of Bombay city school pupils is 6.44. Mean *n ach.* of present study is found to be higher than Madras, Kaira, U. S. A., Brazil and Germany.
2. The mean *n ach.* score of boys is 5.73 and of girls 6.82.
3. *n ach.* score of the pupils according to socio-economic status (SES) are high SES (M : 7.69), middle SES (M : 5.79), and low SES (M : 5.74).
4. The mean *n ach.* score of the pupils of different communities are : Hindus (M : 6.27), Jains (M : 5.83), Muslims (M : 5.20), Christians (M : 8.48), Parsi (M : 8.30) and Punjabis (M : 10.75).
5. The mean *n ach.* score of the pupils studying in Gujarati medium is 4.79 and the mean *n ach.* score of the pupils studying in English medium is 8.96.
6. The mean score of JIM (junior index of motivation) for the pupils of Bombay is 93.83. It can be said that pupils' motivation towards schools is very low in Gujarat and Bombay compared to the USA schools.

ACHIEVEMENT, MOTIVATION, SCHOOL PERFORMANCE AND EDUCATIONAL NORMS

7. The mean score of general anxiety is 21.65. But if a person crosses the limit of anxiety perhaps it may lead to decrease in achievement motivation.
8. The mean score of performance is 46.82. In the present study performance is positively and highly related to achievement motivation.

At the completion of the present study the investigator feels that the field of achievement motivation in secondary and university education is pregnant with various unanswered questions and unsolved problems. The present attempt was to find answers of only a few of them. More and more cross-cultural studies would help the perspective perception of educators about the school pupils.



A Study of Fatigue as Related to Extraversion-Introversion and Neuroticism in an Industrial Setting

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THE present study is an attempt to study the levels of performance at different times in a day and find out its relationship with extraversion-introversion and neuroticism in an industrial setting. In fact, fatigue is not only an industrial phenomenon but it affects our day-to-day performance, classroom teaching and influences the intake capacity of the students.

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Introduction

Fatigue is a state of the individual which exerts negative influence on his performance. Ergographic studies of this concept showed that prolonged work results in deterioration in muscular energy. However, fatigue is not only physical but mental too. It was Wells and Goldmark who, for the first time, questioned it and proved that the level of work can be maintained by motivating the individual. Later on, other researchers worked on its different aspects.

Bartley and Chute (1954, 1947) conceptualized fatigue in terms of the organization and not physical energy. They believed that fatigue might be just a personal state which in turn is the result of a conflict. Maier (1970) said that a man's will to work is influenced by motivation. Bartlett (1943, 1951, 1953) believes that when the performance is continuously repeated an increasing irregularity occurs in the internal timing layout of the successive items. There is yet another view about fatigue. According to Woodworth and Schlosberg fatigue might be considered as an example of internal inhibition.

It has been found in a number of studies that introverts and extraverts have significant difference in terms of many functions, e. g. perceptual functions, work decrement, etc. Though there are a lot of controversies over it, still Eysenck classification of personalities as extraversion-introversion and neuroticism represents the basic dimensions of personality.

The studies and researches on fatigue can be classified under the following heads: experimental studies, perceptual studies, studies on simulated work conditions, studies on real-life conditions, and studies emphasizing subjective conditions. It is not possible to reproduce these studies here but the titles themselves show that these studies are divergent in nature.

Sample

The sample of the present study consisted of workers doing three types of jobs, viz. foundry work, shop floor operation and winding. The tools to be used were tested. The final sample of the study consisted of 40 foundrymen, 60 operators and 40 winders. The following batteries of tests were administered to the three groups.

Battery 1 : Administered to Foundrymen

Hand dynamometer, hand steadiness, the reaction time (simple,

choice and discriminative), tapping, spiral after-effect, necker cube fluctuations (under passive viewing, instruction to control and instruction to accelerate the fluctuation conditions), and time sense. A fatigue inventory was developed by the investigator and was administered to this group along with this battery.

Battery 2 : Administered to Operators

All the tests mentioned above except the hand dynamometer were administered to this group.

Battery 3 : Administered to Winders

Hand steadiness, tapping, blink method, critical flickers fusion, brightness perception, size perception, motion perception, symptoms check-list and rating scale constituted this battery.

Battery 1 and 2 were administered at four times of the day, viz. beginning and end periods of both forenoon and afternoon sessions of the working day and the third battery was administered to the respective group six times of the day, i. e. beginning, middle and end periods of both forenoon and afternoon sessions of the working day. Eysenck personality inventory was used to study the levels (high and low) of extraversion and neuroticism. Since the subjects of this study were Tamil-speaking, the Tamil version of EPI was prepared and used. The final form of the fatigue inventory (in Tamil) developed by the investigator himself consisted of 33 items. The reliability coefficient computed with the help of Kuder-Richardson formula was 0.72. The test-retest reliability coefficient was 0.50. The validity of the inventory was worked out by finding the reliability index which was 0.85.

The investigator decided to construct two levels of extraversion and neuroticism to study their effect on the level of functioning at different periods. Thus the following four groups were formed :

1. High extraversion, high neuroticism (EN)
2. High extraversion, low neuroticism (En)
3. Low extraversion, high neuroticism (eN)
4. Low extraversion, low neuroticism (en)

A $4 \times 2 \times 2$ factorial experiment was done on various scores of the psychological tests administered to the foundrymen and the shop floor operators and a $6 \times 2 \times 2$ factorial experiment was performed on the data collected with the winders.

Results

The major findings of the study are given below.

1. The period of the working day affects simple and choice reaction time among the foundrymen, hand steadiness, simple, choice discriminative reaction time, gross speed of tapping, the necker cube fluctuations under all the three conditions of administration among the shop floor operators and the blink value and the feeling of fatigue among the winders.

2. Extraversion affects the following : the spiral after-effect among the foundrymen, choice reaction time, necker cube fluctuations under passive condition, time sense among the operators and hand steadiness and tapping among the winders.

3. The simple reaction time, necker cube fluctuations under instructions to control manifestations of fatigue among the foundrymen and the operators, the blink value, brightness perception, motion perception symptoms of fatigue as well as feelings of fatigue among the winders are affected by neuroticism.

4. No systematic interaction effect is seen in general among the variables studied in the present context.

5. It is plausible that disorganization in overall functioning of the workers can be discerned while they are continuously engaged in their normal day's work in an industrial setting. Extraversion does not contribute to fatigue while neuroticism does in the present context.

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[Abstract prepared by Neerja Shukla]



Effectiveness of Microteaching as a Technique in Teacher Preparation Programme

S.M. JOSHI

STUDENT teaching being the weakest but the most important link in teacher education programme, this study aims at providing an innovative alternative to restructuring teacher preparation by trying the technique of microteaching, particularly in the acquisition of four teaching skills, viz. (i) skill of stimulus variation, (ii) skill of illustrating with examples, (iii) skill of silence and non-verbal cues, and (iv) skill of recognizing attending behaviour.

The experimental study comprises two phases : first, an experiment on the effectiveness of skill-based instructional materials synchronized with microteaching and second, the effect of different training approaches on the attitudes of student-teachers towards teaching.

Null Hypotheses

H₁ : Student-teachers exposed to the treatment of skill-based instructional materials synchronized with microteaching for the skill of stimulus variation do not differ in the acquisition of the skill from the student-teachers exposed to the traditional student teaching programme.

H₂ : Student-teachers exposed to the treatment of skill-based instructional materials synchronized with examples do not differ in the acquisition of the skill from the student-teachers exposed to the traditional student-teaching programme.

H₃ : Student-teachers exposed to the treatment of skill-based instructional materials synchronized with microteaching for the skill of silence and non-verbal cues do not differ in the acquisition of the skill from the student-teachers exposed to the traditional student-teaching programme.

H₄ : Student-teachers exposed to the treatment of skill-based instructional materials synchronized with microteaching for the skill of recognizing attending behaviour do not differ in the acquisition of the skill from the student-teachers exposed to the traditional student-teaching programme.

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July 1978

H₅ : Student-teachers exposed to the treatment of skill-based instructional materials synchronized with microteaching do not differ in the acquisition of general teaching 'competence' from the student-teachers exposed to the traditional student teaching programme.

H₆ : Student-teachers exposed to the treatment of skill-based instructional materials synchronized with microteaching and student-teachers exposed to the treatment of traditional student-teaching programme do not differ in their attitude towards teaching.

Preparation of the Skill-based Instructional Materials

Handbooks of skill-based instructional materials for different skills were prepared, tried out and finalized, on the basis of reactions of a sample of 25 teacher-educators of the Faculty of Education and Psychology and Gujarat Vidya Pith, 5 research fellows of CASE, 10 B.Ed. student-teachers of the Faculty, 5 inservice teachers in local schools, and 15 microteaching seminarians. Besides, all the four observation schedules were tried for their content validity and inter-observer reliability.

Sample

The sample comprised 34 student-teachers, selected randomly out of 160 student-teachers of the Faculty of Education and Psychology (MSU) for the session 1975-76. They made two experimental groups with 16 and 9 student-teachers, respectively, and control group of nine student-teachers. The sample of student-teachers could be divided in different categories, viz., in terms of age-group : 20-29 years (10, 7, 8)*, 30-39 (5, 2, 1) and 50 and above (1 in group A); in terms of teaching experience : Nil (5, 7, 4), Less than 9 years (1 in group A), 1-4 (6, 2, 5), 5-9 (3 in A), and 10 and above (1 in A); in terms of qualifications : postgraduates (9, 6, 6) and graduates (7, 3, 3), and in terms of method subjects : history and geography (2, 1, 1); geography and English (5, 2, 2); geography and science (3, 1, 1), English and Hindi (2, 1, 1), science and Hindi (1, 1, 1), English and home science (1, 1, 1), and science and mathematics (2, 2, 2). These student-teachers were assigned two schools in distant corners of the city to avoid interaction.

Tools Used

An observation schedule for each of the four skills was developed and

*Figures in brackets indicate distribution as per three groups A, B and C, respectively

used. Besides, Madhooker Patel's Intelligence Test (MPIT), Ahluwalia's Teacher Attitude Inventory (ATAI) and Baroda General Teaching Competence scale (BGTC) were also used in these experiments.

Design

Parallel Group covariance made the basis of the experimental design. The pre-experiment scores of all the groups on the basis of intelligence test (MPIT), and Teacher Attitude Inventory (ATAI) were used as covariates. The experiment was conducted in two stages : First, one experimental group was made to use the skill-based instructional materials on the first three teaching skills while the control group was acquainted with the technical skills of teaching along with the traditional student-teaching programme. Then, the second experimental group was made to use the skill-based instructional material on the fourth teaching skill while the control group was retained as it were during the first stage.

However, all the three groups were given a lecture on technical skills of teaching with reference to the four skills of teaching. The experimental groups were, in addition, exposed to the treatment of microteaching which consisted of : (i) lecture and film on microteaching technique followed by discussions ; (ii) study of the skill-based instructional material on relevant teaching skills ; (iii) training in observations and feedback ; (iv) simulation and a model lesson by the investigator, and (v) practice by student teachers in the selected teaching skill. Delivery of four fully observed lessons by each group in the relevant skills formed the basis of their final score. Besides, the post-test achievement of these groups on BGTC scale and ATAI measured change in their general teaching competence and attitude towards teaching.

Analysis

The results of the experiment were put to empirical test by applying the ANCOVA and finding out their 0.01 level of significance in the case of each of the four skills, general teaching competence and attitude towards teaching. The four skills and the general teaching competence of the experimental groups are worked out to be significant at 0.01 level as they show t-values at 7.67, 9.77, 6.18, 11.45 in four respective skills, and 9.75 and 8.20 in case of general teaching competence. As a result, the first five null hypotheses are rejected by the experiment. The sixth null hypothesis is, however, not rejected on the basis of ANCOVA and level of significance results. The t-value here is not significant as it is only 0.468 in one case and 0.604 in the other group.



Findings

1. Student-teachers exposed to the treatment of skill-based instructional materials synchronized with microteaching for the skill of stimulus variation score higher in the acquisition of the skill than the student-teachers exposed to the traditional student teaching programme.

2. Student-teachers exposed to the treatment of skill-based instructional materials synchronized with microteaching for the skill of illustrating with examples score higher in the acquisition of the skill than the students-teacher exposed to the traditional student teaching programme.

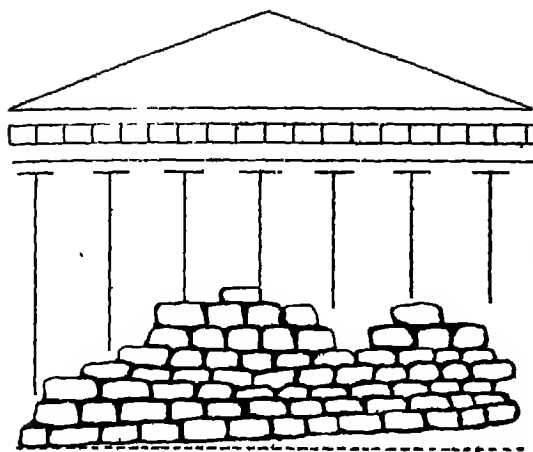
3. Student-teachers exposed to the treatment of skill-based instructional materials synchronized with microteaching for the skill of silence and non-verbal cues score higher in the acquisition of the skill than the student-teachers exposed to the traditional student teaching programme.

4. Student-teachers exposed to the treatment of skill-based instructional materials synchronized with microteaching for the skill of recognizing attending behaviour score higher in the acquisition of the skill than the student-teachers exposed to the traditional student teaching programme.

5. Student-teachers exposed to the treatment of skill-based instructional materials synchronized with microteaching score higher in the acquisition of the general teaching competence than the student-teachers exposed to the traditional student teaching programme.

6. Student-teachers exposed to the treatment of skill-based instructional materials synchronized with microteaching and student-teachers exposed to the treatment of traditional student teaching programme do not differ in their attitudes towards teaching.

[Abstract prepared by D.N.Khosla] □



Research Notes

A Review of Researches on Effectiveness of Microteaching in India

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As a technique of teacher training in India microteaching is in its infancy, and many issues related to its most effective use have not as yet been resolved. Even then most of the studies conducted in this area show that it is feasible and it is an effective technique in the modification of teacher behaviour. The studies discussed here are categorized in different broad frame of references : (i) on effectiveness in relation to traditional teaching and other techniques like interaction analysis system ; (ii) on different variables within microteaching setting—modelling and feedback, and (iii) studies on effectiveness of microteaching in the development of different teaching skills,

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In the year 1967 Tiwari led a project in microteaching at Allahabad Pedagogical Institute and found that the scheme can be used profitably both in the teacher training institutions and secondary schools. Some elements of individual teaching, if introduced in the scheme of teaching in practising schools will display the student-teacher's insight and make them more alert to the individual needs of the pupil. Then, in the year 1970, Shah started a small experiment in microteaching procedures. He observed that the tape-recorder helped the teacher in correcting his mistakes.

Subsequently, a number of studies showed that it is a feasible and effective technique in the modification of teacher behaviour. On the broad frame of references stated above the studies conducted so far in the area of microteaching have been reviewed here.

On Effectiveness of Microteaching

When a growing dissatisfaction among educators regarding the existing practice teaching arose, microteaching originates at this time. The present-day teaching practice programmes have been criticized by Education Commission (1966), and other researchers on account of its subjectivity, theoretical bias; absence of specific instructions; skill training, modelling dynamic feedback; and of ill supervision. As microteaching is a controlled practice technique which is safe and having 'low risk'; which is focussed to a particular teaching skill having immediate feedback; which is a vehicle for continuous training, economic in terms of time and resources. This technique is highly effective on the development of teaching competence over the traditional approaches. This has been verified from the following studies.

Chudasama (1971) found that microteaching was more effective than the traditional technique in the development of indirect teacher behaviour and interaction analysis can profitably be synchronized with microteaching procedure. In the subsequent year, Marker conducted a study which aimed at comparing the performance of student-teachers trained by microteaching and conventional approaches. The sample selected was from only geography method group. Five skills, e.g. (i) set induction, (ii) stimulus variation, (iii) questioning, (iv) response to pupil's answers and reinforcement, and (v) closure were selected. The microlessons were given in the normal geography classes. The lessons were recorded on a tape and feedback was given on the following day. Microteaching was found to be quite effective. Marker in the year 1973, conducted another experiment on microteaching in simulated conditions. Results were

again found to be encouraging. Thereafter, in the year of 1974, two doctoral studies by Singh and Bhattacharya illuminate in the field of teacher education on the significance of microteaching. Singh (1974) compared the effectiveness of microteaching technique and Flanders' Interaction Analysis with verbal teacher behaviour. He selected a sample of 20 student-teachers from a teachers' college in Uttar Pradesh. It was divided into three groups. One group received the treatment through microteaching, the other through Flanders' Interaction Analysis technique, and the third was the control group of ten student-teachers which received the treatment of traditional method of training. The results indicated that (i) student-teachers trained through microteaching and those through Flanders' Interaction Analysis technique changed their verbal teaching behaviour in the classroom more significantly compared to the student-teachers trained in traditional way only ; (ii) the student-teachers trained through microteaching changed their verbal behaviour in the classroom significantly better than those trained through FIACS. Bhattacharya (1974) while experimenting this technique with polytechnic teachers, found that microteaching was more effective than the conventional technique in the development of indirect teacher behaviour. In the year 1976, Passi and Lalithamma, and Joshi in 1977 in their doctoral studies on the development of various teaching skills have taken up more comparable assessments on effectiveness of microteaching. They have inferred from their studies that on the development of general teaching competence the skill-based microteaching is highly significant than traditional teaching. They have also informed that there is no significant differences on the change of attitude of the student-teachers among microteaching group with that of traditional teaching practice. All the three studies referred here are in simulated conditions within microteaching setting.

Various Dimensions within Microteaching Setting

Microteaching, as a technique, may be varied on a number of dimensions. Some of the dimensions of this technique are : (i) modelling—visual/perceptual or symbolic ; (ii) microsetting—time scheduled/size of the class ; (iii) conditions—either simulated, read or both mixed ; supervision and feedback—by pupils, peers, supervisors, audio/video tape, self-analysis/no feedback ; more variations in feedback like immediate/delay, written/oral or both, individual/group, descriptive/prescriptive, rating/category/sign system of supervision ; (v) teach/reteach with same unit or with different units.

Vaze (1975), in his doctoral study on effects of modelling and microteaching on the acquisition of certain skills in questioning, developed

different types of models—audio and symbolic—depicting the use of the three skills in asking probing, convergent and divergent questions. Then he studied about the effectiveness of modelling and microteaching treatments on acquisition of the three skills in questioning at different stages of the acquisition. Three different treatment variables exposed to (i) symbolic modelling, (ii) audio modelling, and (iii) to microteaching. The study concluded that (i) the superiority of microteaching treatment was established over symbolic and audio-modelling treatment in acquisition of skills on asking the above questions when the trainees were not exposed to classroom teaching ; (ii) the audio-modelling was a better technique when compared to the symbolic models for the development of the skills in questioning.

Though Thresiamma (1975) studied the effectiveness of feedback in the development of the skills of recognizing attending behaviour and teacher liveliness among inservice teachers, even then she did not extend her experiment on the relative effectiveness of various feedback treatments. Recently, two studies, one by Sharma (1977) and other one by Ray (1978) during their doctoral programmes have conducted on the relative effectiveness of various feedback treatments taking pre-service and inservice teachers respectively as measuring subjects. Sharma has emphasized that the group having supervisory feedback in microteaching is as effective as that of the group treated peer student-teachers feedback on the acquisition of teaching skills related to stimulus variation, reinforcement, silence and non-verbal cues on the development of general teaching competence. There is no significant difference among the two groups of different dimensions of feedback. But, Ray in his study on inservice teachers found that though microteaching is significantly effective to the conventional approach having some filler task on teaching skills considering most equivalent group but there is no significant effectiveness among various feedback treatments related to self-analysis through audiotape, supervisory feedback and supervisory-cum-audiotape within the microteaching technique. These variables are equally effective on acquisition of teaching skills : Probing questioning, explaining, illustrating with examples, reinforcement and stimulus variation through microteaching on the development of general teaching competence. Pangotra (1973) in his study states feedback from college supervisor and external observers are more effective on the classroom behaviour of student-teachers than no feedback control group. But his study was not in microteaching setting nor even the training of teaching skills.

There is not a single study on the relative effectiveness of simulated and real conditions either for a doctoral or postgraduate project except

within the national project which will be referred to here separately. But many researchers have used the simulated conditions and some have used real conditions for their studies.

Development of Teaching Skills

As the operational definition of microteaching is the acquisition of teaching skill through a system of controlled practice on a scaled-down teaching encounter for the overall development of teacher behaviour, the need for developing the teaching skills has come to the existence in the teacher education programme. Passi and Shah (1972) found that microteaching was effective in developing the skills of questioning, reinforcement, silence and non-verbal cues, and illustration with use of examples. They further found the technique to be feasible both in real and simulated conditions and the student-teachers have developed favourable attitude towards the technique. Thereafter, Joshi and Abraham in the year 1974 have initiated the development of some teaching skills. But Passi and Lalithamma (1976) and Joshi (1977) have accelerated this major aspect in developing 13 teaching skills and tested their feasibility in the Indian conditions. Passi has developed the instructional materials on skill of introducing a lesson, achieving closure, fluency in questioning, probing questioning and reinforcement. Lalithamma has prepared the materials on skills of increasing pupil participation, explaining, using blackboard, writing instructional materials, whereas Joshi on four teaching skills : stimulus variation, skill of illustrating with examples, silence and non-verbal cues and recognizing attending behaviour. Before developing these 13 instructional materials on teaching skills, they have identified these skills under four broader aspects, i. e. skills of planning, skills of instructions, skills of evaluating and closure, and skills of managerial objectives. They have also inferred that in simulated conditions and on the development of above teaching skill, taking one at a time, microteaching is highly significant than those of control group having traditional teaching.

National Project

Although the studies reviewed above are encouraging regarding the effectiveness of microteaching technique, such studies have been sporadic and lack comprehensiveness to arrive at any generalization. Further, there is

no study completed by 1975 which has compared the effectiveness of this technique with the traditional technique as regards the development of general teaching competence. Hence there is a need to undertake studies at national level which are more comprehensive and systematic to find out the comparative effectiveness of microteaching and traditional approach to teacher training in developing general teaching competence. To fulfil this need, NCERT (1976) had undertaken a national master project in collaboration with CASE with a view to finding out the feasibility and effectiveness of microteaching as a technique for pre-service teacher preparation in Indian conditions.

The eight associate colleges of education of this country had taken up their own sub-projects within the broad framework of the master project. In each and every case the pre- and post-test parallel group experimental design was undertaken. Five teaching skills developed in CASE : Probing questioning, stimulus variation, reinforcement, illustration with examples and explaining were used by the associate colleges. For standardized treatment in the sub-projects the standard microteaching (SMR) having perceptual modelling and peer feedback; modified microteaching (MMT) having different variables in feedback, modelling, etc. as the experimental group and traditional teaching as the control group were taken into consideration in each case. Of the eight institutions included in the study, five of them brought in variation regarding feedback—peer and supervisor; two of them took the variable with respect to modelling—perceptual and symbolic, and one institution had no modified microteaching (MMT) treatment. The overall study revealed that microteaching either under simulated or in real classroom situations were highly significant to the traditional teaching in case of such institutions with different treatments of feedback as the variable. In two of the institutions having treatments on modelling as the variable, microteaching proved equally effective as traditional teaching. Regarding the feedback as the variable within microteaching setting the results revealed from the three institutions that supervisory feedback was equally effective to peer student-teacher feedback whereas one institution stated that supervisory feedback was more effective than peer girls student-teachers feedback in SMR group. The other institutions on modelling as the variable inferred that perceptual modelling was as effective as symbolic modelling.

The second phase of this national project was undertaken during the subsequent year, 1976-77, on the same objectives and hypothesis but in a broader dimensions of microteaching. Twenty-two participants took up separately five treatment variables on (i) modelling, (ii) feedback, (iii) real simulation, (iv) change in set of skills, and (v) change in teaching units. Six participating institutions have concluded that the form of modelling—

either perceptual, symbolic or audio—does not make any substantial difference in the development of general teaching competence. Variations in the sources of the feedback were studied by seven institutions. Six of them changed from peer to supervision feedback and one from peer to audiotape feedback. None of the studies found any significant change on the development of general teaching competence of the student-teachers due to change in the sources of feedback. Out of six institutions, three found significant change from simulated microteaching conditions over real classroom conditions on the development of general teaching competence whereas other studies are equally effective. Only two participating institutions took up separate five teaching skills other than the standard and specific teaching skills and they studied the comparative effectiveness among those sets of teaching skills on the development of teaching competence. Lastly, only one institution conducted a study, the effect of change in teaching units during 'reteach' session of microteaching on the development of general teaching competence. In both the cases, i.e. change in sets of teaching skills and change in units of teaching subjects, the results indicated no significant development on general teaching competence. Moreover, in all these studies all the five treatment variables did not produce any significant change in the attitude of student-teachers towards teaching.

Studies on Inservice Programme

The most neglected side of the teacher education programme is the inservice teachers. All the new patterns, teaching techniques, different instructional methods, tactics and even researches on them are implemented and practised to the preservice teachers rather inservice teachers.

Even then only two studies, one in the postgraduate level and another for the doctoral level, emphasizing only on feedback variables have come to the picture. Ray (1978) in his doctoral programme conducted a study on effect of various treatments on acquisition of teaching skills through microteaching and found that (i) microteaching and acquisition of certain skills which are developed for preservice programme are feasible for inservice teachers' training programme; (ii) on the development of general teaching competence the effect of microteaching is significantly higher than that of equivalent traditional group of acquiring same teaching skills; (iii) self-analysis with audiotape, supervisory feedback and supervisory feedback with audiotape are equally effective to each other within microteaching programme; (iv) for the development of teaching competence on specific five teaching skills, microteaching is highly significant than that

of filler group with traditional practices; (v) practices of specific five teaching skills through microteaching under any kind of feedback treatments have been carried over to microsituation, and (vi) acquisition of teaching skills either through microteaching or through traditional approach does not influence the teachers' attitude towards teaching profession.

During 1976, Dr. M. B. Buch and Dr. B. K. Passi, and Dr. G. B. Shah have submitted two project proposals on 'International Transfer of Self-Instructional Microteaching Course on Effective Questioning', during the conference of International Microteaching Research Unit at University of Lancaster, U.K. These studies would be employing mostly experimental design with field setting involving inservice teachers only, as per Shah's proposal, and both pre-service and inservice teachers as per Buch and Passi's proposal. The main objectives of both the proposals are to evaluate the changes in teaching behaviour after completing a self-instructional microteaching course on effective questioning and to test the feasibility of this adopted version in the Indian condition. The adopted version of self-instructional microteaching course has been prepared in the Indian context both in English and Hindi scripts. These packages have been developed, standardized and finally employed in major field testing in a pretest-posttest control group design. These studies have inferred the feasibility in Indian conditions and support the international transfer for teacher training materials for modification of teacher behaviour.

There are no research evidences regarding the optimal number of students for microteaching sessions; optimal number of times of cycle for 'teach-reteach-refeedback' till the competency in particular skill; immediate or delayed feedback; and in other dimensions as stated, except some studies on feedback and modelling. So, before implementation of this practice in teacher education programme, a number of studies may be undertaken in different dimensions for ascertaining the effectiveness of microteaching in Indian condition.

Moreover, other studies likes the adaptation of mini-courses for inservice teachers and with some modifications for pre-service teachers in Indian situations without using CCTV/videotape or even taperecorder can be undertaken. The effects of students' learning by the developed behaviour of teacher after competency in teaching skills through microteaching may be assessed in other studies and the relationships between teacher and students performances can be dealt with. A comparative study may also be undertaken about the achievement of the students, taught by the teachers trained through microteaching and that of students taught by the traditional teachers. From the above studies we can focus the interaction between teacher behaviour and overall objective, i. e.

modification of pupil behaviour.

In Baroda, a number of teaching skills have been developed and all these skills have been tested for preservice teachers through microteaching. But no study is there whether a teacher, either inservice or pre-service, can acquire those skills without microteaching technique. So a comparative study on effectiveness of acquisition of teaching skills through microteaching and that of teaching skills through traditional teaching or any other teaching technique may be undertaken.

Lastly, as per Allen and Eve's view : Microteaching stands today as one of the few experimental techniques which by its very structure encourages a combination of theory and practice, research and training, innovation and implementation.

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An Analogy between Piagetian Grouping of Thought and Group Theory in Algebra

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It was in 1920, that J. Piaget, while working with Dr. Theophile Simon in Paris, to develop a standardized test, found that the children's incorrect answers were fascinating. He found that the same wrong answers occurred frequently in children of the same age. From the analysis of the nature of the mistakes, he came to the conclusion that older children were not only just brighter than younger ones, but also the thought of younger children was qualitatively different from that of older ones. On the basis of the quality of the responses at different age level, Piaget divided intellectual development into four major periods : (i) Sensorimotor period (0 to 2 years) ; (ii) Pre-operational period (2 to 7 years) ; (iii) Concrete operational period (7 to 11) years ; and (iv) Formal operational period (11 years and above). The characteristics of these four stages are given below.

1. Sensorimotor Period (0 to 2 Years)

During this period language appears and symbolic functioning makes its acquisition possible.

2. Pre-Operational Period (2 to 7 Years)

This was further sub-divided into two periods : (a) Ranging from (2 to 5 years), and (b) Ranging from (5 to 7 years).

At the stage (a) the child fails to construct hierarchical arrangements because after a short while he forgets the defining property which he has used to form a collection. At the stage (b) the child can construct a hierarchy because he can use a defining property to determine which

objects go in a collection. But he cannot understand inclusion relations.

3. *Concrete Operational Period (7 to 11 Years)*

At this stage, concrete operations are organized. Operational grouping of thought concerning objects can be manipulated or known through senses. Child can correctly answer questions concerning inclusion, because of his ability to think of original classes and their derivatives at the same time. But the child fails to comprehend the same relations when imaginary classes are involved.

4. *Formal Operational Period (11 Years and above)*

At this stage, actions are internalized. The child can operate on operations. He can compensate mentally for transformations in reality. Mental operations have reached a high degree of equilibrium thus effecting a second degree grouping of operations.

From the above mentioned characteristics it becomes clear that 'grouping of thought' starts at the third stage of development of intellect. Our further discussion, primarily, will be focussed on the third stage, i. e. concrete operational period.

Let us now see both the terms 'operation' and 'grouping' from the point of view of logicians as well as psychologists, to compute the similarities between the two viewpoints. According to psychologists operation means to arrive at a real functioning of intelligence or to revert the thinking in terms of actions. While according to logicians or mathematicians 'operation' means a symbol, representing an action which could be realized.

Analysis of a mathematical nature has since long recognized the interdependence of operations, constituting certain well defined systems, such as groups. The notion of a 'group' is applied to series of whole numbers, to spatial or temporal structures, to algebraic operations, etc. Psychologically, a 'grouping' consists of a certain form of equilibrium of operations, i. e. actions which are internalized and organized in complex structures and the individual is to describe this equilibrium.

Group Theory and Piagetian Grouping of Thought

The important question here is to determine the conditions of the

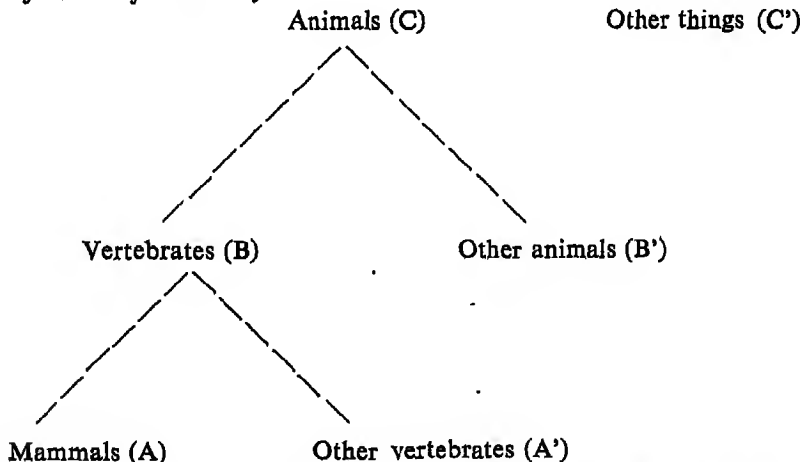
equilibrium (i.e. mobile equilibrium, since operations are actions, the equilibrium of operational thought is in no way a state of rest) in order to be able subsequently to examine how it is formed genetically. These conditions are four in number in the case of a group of mathematical order and five in the case of grouping of a qualitative order. We can make a comparative study of the two types of orders as follows :

In mathematics, a set G equipped with a composition, denoted multiplicatively is called a group, if

- (i) Composition is associative, i.e.
 $a(bc) = (ab)c \forall a, b \text{ and } c \in G$.
- (ii) There exists an identity for the composition, i.e.
 $a \in G$, there exists an element $e, \in G$ such that $a e = a = e a$
- (iii) Every element is invertible, i.e. for every element $a \in G$ there exists an element $b \in G$, such that $ab = e = ba$.

Taking each conditions separately we can compare it with the operations of 'grouping of thought'. For this purpose let us take an example of the sort of classification hierarchy of animals, which the children of the age of 7-11 years or above can construct (according to Piaget's experiments).

Classification of Hierarchy



I. The first condition of a group in algebra is that it should be equipped with a composition, i. e. any two elements of a group may be combined and thus produce an element of the same group. This property is usually referred as closure.

I'. According to Piaget, this first condition expresses the possibility of

coordinating operations in 'grouping of thought', i. e. two distinct classes may be combined into one comprehensive class which embraces them both. For example, if we combine the mammals with other vertebrates, we get the general class of vertebrates. This may be written as $A + A' = B$ or if we combine mammals with vertebrates we get all the vertebrates. We may write this as $A + B = B$. This property describes aspects of the child's ability to understand a hierarchy. If he can mentally construct a large class by combining its sub-classes.

II. Second condition of the group is that composition is associative, i. e.

$$a(bc) = (ab)c \quad \forall a, b, c \in G$$

II'. The property of associativity in 'grouping of thought' may well be illustrated from the given example of classification hierarchy.

Suppose we want to combine three classes such as mammals, vertebrates and animals, i. e. A, B and C. We cannot add all the three at a time, since the operator (combining) is binary, i. e. it can be applied only to two elements at a time. Therefore, there are at least two ways of adding A, B and C. *First*, We can add mammals to vertebrates and get vertebrates and then adding vertebrates to the animals we get animals in general, i. e.

$$i \quad (A+B) + C = C$$

Second, We can do by combining the mammals with the combination of vertebrates and animals and finish with the same results, i.e. animals in general,

$$ii \quad A + (B+C) = C$$

From first and second, we get

$$(A+B) + C = A + (B+C)$$

Thus associativity expresses the fact that the child can combine classes in different orders and can realize that the results are equivalent.

III. The third condition of the group in algebra is that there exists an identity for the composition, i. e. for every element a belonging to G , there exists an element e , $\in G$ such that

$$ae = a = ea$$

III'. In the child's classification of 'grouping of thought' identity states that there is a special element in the system (the 'nothing' element) which when combined with any of the other elements produces no change. From our example, cited before, if we combine to 'nothing' element with mammals, the result will be mammals. More correctly, if we do not combine the mammals with any of the other classes, then of course we still have the mammals.

IV. The fourth condition of the group is that every element is invertible, i. e.

$$ab = e = ba \quad \forall a, b, e \in G$$

IV'. The reversibility in 'grouping of thought' can be illustrated from the given example. Suppose we combine the mammals with all other vertebrates, we get all vertebrates. But if we take away inverse or negation of all the other vertebrates except mammals then again we are left with mammals. This type of operation expresses the aspect of class inclusion. Such a reasoning underlies the child's ability to say that there are more vertebrates than mammals, i. e. mammals are more included in the class of vertebrates.

V. The fifth property of 'grouping of thought' is unique. It has several aspects. One of them has to do with special identity elements. Suppose we combine the class of mammals with itself, the result is mammals. We may write this as :

$$A + A = A$$

In this equation A functions as an identity element. Piaget calls this a tautology. Another aspect is resorption. If we combine the class of mammals with the class of vertebrates the result is vertebrates. We may write this :

$$A + B = B$$

Here too, A functions as an identity element. In a sense, this is another way of looking at inclusion relations.

These are some of the aspects of grouping, described by the processes underlying the child's classifications.

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Mathematics Education and Cognitive Factors

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INTRODUCTION

DEVELOPMENT of intellectual abilities as the aim of teaching mathematics has been an issue of debate for mathematicians and mathematics educators, since the dawn of scientific and technological age. It has been desirable to determine which of the many intellectual abilities are involved in successful learning of a school subject like mathematics. Such an information would help better prediction of achievement in the subject. A number of theoretical models for selection of aptitudes have been developed by different specialists (Melton, Glanzer, Guilford) for this purpose. Aptitude Research Project (ARP) at the University of Southern California has demonstrated a great variety of intellectual aptitude factors with an implication of the question whether or not these unique abilities have significant relationships to the area of intellectual functioning in everyday life.

Contemporary thinking in education emphasizes the desirability of individualizing instruction in order to maximize 'pay off' in terms of achievement, retention, and transfer of learning because Bloom (1968), Cronbach (1957, 1967), Gagne (1967), Glanzer (1967), Jensen (1967-68) and other educational psychologists have suggested that no single instructional process provides optimal learning for all students. A greater proportion of students would attain the instructional objectives when instruction is differentiated for different types of students to suit individual differences in learning capacity. Cronbach (1957) encouraged psychologists to combine their interests in methods to observe experimental effects for subjects of different characteristics and to conduct investigations to find aptitude-treatment interactions (ATIs). The goal of research on ATI is to find significant disordinal interactions between alternative treatments and personological variables. Personological variable is defined as any measure of individual characteristic, e. g. IQ, scientific interest, age, sex, etc. ATI research seeks to provide a basis for employing differential treatments in order to exploit

the cognitive preferences displayed by different individuals for differing content or mode of instruction. Its major aim is to acquire knowledge of the cognitive processes required by various learning tasks in order that instruction can be adapted to the individual characteristics of the learner and to design treatments to fit groups of students with particular aptitude pattern. The aim of this article is to outline a few research studies conducted in the area of cognitive factors and their relationship with mathematical learning.

REVIEW OF RESEARCH

Petersen, *et al.* (1963) attempted to determine the structure of intellect abilities involved in ninth-grade algebra and general mathematics. The study was conducted in Lynwood California High School which taught four different mathematics courses, namely, basic mathematics, non-college algebra, regular algebra and accelerated algebra. The main hypothesis in this study dealt with forecasts as to which abilities should have the greater promise of predicting achievement in general mathematics and algebra. A battery of 25 factor tests carefully selected was administered in the mathematics class and was factor-analysed. An achievement test used for criterion measures was also administered after a full school year of class instruction. It was concluded that :

- (i) Batteries of factor scores were better predictors of achievement than standard test, especially in algebra;
- (ii) A composite of 13 factor scores gave increased prediction when added to standard test combinations significantly so in algebra courses;
- (iii) Combinations of factor test scores discriminated between successful algebra students and general mathematics students;
- (iv) With only predictors that gave statistically significant contribution to prediction of achievement, some 12 different factors were found relevant. Most of these factors are from symbolic category, very few are cognition factors and quite a number are evaluation factors; most of them deal with products of relations and implications. Factors relevant to algebra are cognition of semantic systems (CMS), convergent production of symbolic relations (NSR), cognition of symbolic implications (CSI), convergent production of symbolic systems (NSS), cognition of symbolic systems (CSS), convergent production of symbolic transformations (NST), cognition

of symbolic relations (CSR) and cognition of semantic units (CMU). Cognition of symbolic classes (CSC) was suggested to be added in new mathematics logically.

- (v) Most of the factors that are relevant to discriminate between the two kinds of students (general mathematics and algebra) are also relevant for prediction.

An ATI research was conducted by Hancock (1972) to examine the interaction between the personological variables of sex difference and mental factors selected from Guilford's structure of intellect (SI) model with two (verbal and figural) modes of presenting to university undergraduates selected concepts and principles associated with a linear order relation. The significant findings of that study are summarized below :

- (i) The experimental group that studied the verbal programme did significantly better on most of the criterion measures than did the group that studied the figural programme.
- (ii) There was no evidence found to support a claim of disordinal interaction.
- (iii) Female subjects scored significantly higher than males on achievement tests at the highest cognitive level.

A similar study was done by Hancock on the ninth-grade students in 1975 with a view to (i) determining if the ninth-grade students would exhibit an adaptability, similar to that of university undergraduates, to verbal, as opposed to figural material in learning mathematical relation; (ii) attempting to identify personological variables that might be significantly related to differing cognitive preferences, and (iii) seeking evidence that instructional materials that will interact with differing profiles of individual aptitude can be prepared. Subjects in this study were 119 ninth-grade students from seven different sections of mathematics in a local junior high school.

Independent variables in this study were IQ scores, standard achievement scores in mathematics and scores on a battery of nine tests developed by Guilford, *et al*, purporting to measure cognitive ability in dealing with figural, semantic and symbolic content. The nine aptitudes were: CFU, CFC, CFR, CMU, CMC, CMR, CSU, CSC and CSR. Dependent variables were scores on a learning test administered the following day, as well as scores on a retention test four weeks later. The following are the findings of this study :

- (i) No significant difference was found between the two treatment groups, i. e. studying verbal and figural material.
- (ii) Females showed an overwhelming superiority on five of the six criterion measures.
- (iii) Regression analysis revealed 17 disordinal interactions of which 13 occurred on the test of retention and only four on tests of immediate learning which implies that instructional modes that may be adequate when immediate learning is the criterion may not be adequate when retention is the objective.
- (iv) Of the significant interactions present in this study, eleven involved semantic factors, four involved symbolic factors and only one involved a figural factor.
- (v) Disordinal interactions related to sex differences indicated that eight of the nine such interactions involved male students.

Webb and Carry (1975) did another investigation to find interaction of spatial visualization and general reasoning abilities with instructional treatment in quadratic inequalities. The purpose of this study was to replicate Carry's (1968) study and to extend the theoretical basis of the problem by analysing the instructional treatments and criterion variables using a multiprocess theoretical model due to Melton (1967). Two hundred and forty-nine students were randomly assigned to one of the two treatment groups; Group A, a verbal symbolic numeric-treatment and Group G, a verbal spatial-numeric-treatment. The main hypotheses were that spatial visualization would predict transfer from the analytic group and that general reasoning would predict transfer from the graphical group. When the results were analysed using multiple linear regression, no interactions were found between any aptitude variable and the treatments.

Eastman and Carry (1975) conducted the third study on interaction of spatial visualization and general reasoning abilities with instructional treatment in quadratic inequalities. Eighty students were randomly assigned to one of the two treatment groups—Group A, a deductively structured verbal-symbolic-numeric-treatment and Group B, an inductively structured verbal-spatial-numeric-treatment. The hypotheses were that spatial visualization would predict success on the graphical treatment, and general reasoning would predict success on the analytic treatment. Results were analysed using multiple linear regression. A significant disordinal interaction was statistically confirmed and the hypotheses were accepted.

The next ATI investigation was carried out by Behr and Eastman (1975), entitled "Interactions between structure of intellect factors and two methods

of presenting concepts of modulus seven arithmetic" which was related directly to two earlier studies by Behr (1970) and Eastman (1972). Behr (1970) investigated possible interactions between 14 mental abilities and two modes (figural and verbal) of presenting concept of modulus seven arithmetic. Of the 14 factors, it was found that only four produced significant interactions. The purpose of present study was to replicate and generalize the findings of these two earlier studies (Behr, 1970 and Eastman, 1972). Two hundred and five students were pretested for four selected cognitive factors, namely, CFT, CFR, CMU and CMS, and then were randomly assigned to one of the two treatments (figural versus verbal) on a unit in modulus seven arithmetic. Students were given one class period to study the programmed material and one week later retention and transfer tests were administered. The results of this study are summarized below :

- (i) The results did not support the earlier findings by Behr (1970) and Eastman (1972). Perhaps more investigation in the area of aptitude test construction might be justified.
- (ii) The selected aptitude tests were factor-analysed to determine if four distinct theoretical factors of CFR, CFT, CMS and CMU could be found but the results gave two factors (verbal and spatial) only which indicates that some of the SI factors may be collapsible over the product region of Guilford's three-dimensional model.

The last ATI study described here is due to Abkemeier and Bell (1976). The purpose of this study was to investigate relationships between figural and symbolic aptitudes and figural and symbolic modes of presenting mathematics concepts to secondary school students. One hundred and sixty students were measured on eleven aptitudes (five figural, five symbolic and one semantic), selected from Guilford's structure of intellect cube. The aptitudes were CFC, CFS, NFT, NFI, DFS, CSC, CSS, NST, NSI, DSS, and CMS. Students were randomly assigned to either a figural or symbolic mode for learning mathematical concept of function and related concepts of domain and range, through two printed programmed instructional sequences. Immediately following instruction, a learning test was given which was followed by a retention test one week later. Data analysis showed that

- (a) females scored significantly higher than males on all dependent measures and their scores were independent of instructional mode;
- (b) for students of approximately 15 years of age, especially males, a figural instructional mode is preferable to symbolic mode;

- (c) instructional treatment was not found to be significantly related to achievement indicating no significant interactions between instructional mode used and instructional mode preferred;
- (d) divergent production of figural systems (DFS) was found to be the best single predictor of achievement for figural and symbolic modes presentation in most groups. Cognition of symbolic system (CSS) was the second best single predictor of achievement for symbolic treatments. A combination of DFS and CSS proved to be the best combination for predicting success by the symbolic treatment in the total group ;
- (e) cognition of semantic systems (CMS) demonstrated a statistically significant relationship to achievement, both immediate and delayed in total figural group.

DISCUSSION

Results of studies mentioned above have been in general inconclusive of giving support for the general aptitude-treatment interaction hypothesis advanced by Cronbach (1957). The general question asked in these was whether it would be possible to design instructional programmes to suit the learner's mental abilities. A very few results have been given an affirmative answer. It was generally suggested that selection of aptitudes in future be made carefully with considerations to the implications of a model based on sound theory of intelligence. Variable of sex has been suggested to continue to be a variable of interest in future researches. With the recurring problem of aptitude test correlations being inconsistent with the mental factor theory of intelligence, it appears that one of the main obstacles is the lack of strong theoretical background concerning the structure of intellect. It may be that basic research in the identification and measurement of aptitudes unique to mathematical learning is necessary to develop a theory of mathematical aptitudes, which might be distinct from a general theory of intelligence. It is also suggested that investigators should attempt to construct their own aptitude tests to measure specific mental factors.

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Marathwada Graduates

A Study

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Introduction

MARATHWADA comprises the districts of Aurangabad, Parbhani, Nanded, Bhair and Osmanabad. This area was a part of the Nizam's Dominions before the Police Action of 1948, and which after the merger of Hyderabad in the Indian Union, had become a part of the bilingual State of Bombay. The Marathwada University was established on 23 August 1958, for accelerating the progress of educational development.

Since its establishment, the University has conferred 18,712 degrees in the faculties of arts, science, commerce and education. The graduates who had obtained their degrees in the year 1958 completed more than fifteen years, a mature period for collecting information about their experiences. Also the graduates who were conferred degrees in the year 1971, completed more than two years and information regarding their efforts in developing further careers would be interesting.

Sampling Frame

A copy of the register of graduates, entitled, 'Electoral roll of registered graduates in the faculties other than law, medicine and engineering, under section 16 (1) class (A) (4) (4) of the Act' was secured. It was noted

*This work was subvented by the UGC and the Marathwada University. The special employment programme for educated unemployed of the Maharashtra Government helped in carrying out some of the numerical work of the project. My personal thanks go to Shri S.G. Bhogle, Shri T.K. Shinde and Km. P.S. Shinde of the Department of Mathematics and Statistics, for many helpful discussions.

that this register was prepared on 28 March 1969, and naturally it contained names of those graduates who had secured their degrees before the year 1968. Examination of this register showed that names of women graduates were underlined. Since the answers from the women graduates would be different from those of men graduates, it was decided to separate all names of women graduates. Further, the names were classified according to the faculties. For each faculty separate lists of men and women graduates were prepared. Thus, in all, ten strata were formed.

The investigation was a multipurpose one. It was decided to have ten per cent sample from each stratum of the population. The following table denotes sizes of samples drawn from each stratum.

Table 1
SIZES OF SAMPLES DRAWN FROM EACH STRATUM

<i>Sr. No.</i>	<i>Name of Stratum</i>	<i>Men Population</i>	<i>Men Size of the Sample</i>	<i>Women Population</i>	<i>Women Size of the Sample</i>
1.	1969 Arts	3680	368	388	39
2.	1968 Science	2276	228	151	15
3.	1968 Commerce	1382	139	14	2
4.	1968 Education	1026	101	92	9
5.	March 1969 Arts	238	24	30	3
6.	March 1969 Science	153	15	16	2
7.	March 1969 Commerce	96	10	2	0
8.	March 1969 Education	41	4	5	0
9.	November 1969 Arts	728	73	109	11
10.	November 1969 Science	433	43	47	5
11.	November 1969 Commerce	307	31	3	0
12.	November 1969 Education	216	21	32	3
13.	March 1970 Arts	294	29	39	4
14.	March 1970 Science	154	15	6	0
15.	March 1970 Commerce	96	10	1	0
16.	March 1970 Education	54	5	5	0
17.	November 1970 Arts	806	81	150	15
18.	November 1970 Science	506	51	77	8
19.	November 1970 Commerce	274	27	2	0
20.	November 1970 Education	281	28	32	3
21.	March 1971 Arts	395	40	56	6
22.	March 1971 Science	190	19	19	2
23.	March 1971 Arts	125	12	0	0
24.	March 1971 Education	76	6	11	2
25.	December 1971 Arts	962	96	159	16
26.	December 1971 Science	601	60	53	5

MARATHWADA GRADUATES

27. December 1971 Commerce	275	28	2	2
28. December 1971 Education	267	28	44	4
29. March 1972 Arts	563	56	62	6
30. March 1972 Science	269	27	22	2
31. March 1972 Commerce	196	20	4	0
32. March 1972 Education	106	11	13	2
Total	17066	1706	1646	166

With the help of Random Number Table, the elements of population to be sampled, were identified and their addresses were noted. From the Post and Telegraph Office, a permit number of business reply envelope scheme was obtained. Questionnaires were mailed to these addresses along with a letter of request and an addressed envelope.

Out of the total number of 18,712 graduates, 782 graduates could not be approached because their present addresses were not available. Replies from women graduates were very few and hence no conclusions could be drawn.

Percentage of Graduates Belonging to Marathwada University

Since graduates of any Indian university established by law, who ordinarily reside or carry on business in the university area were entitled to have their names enrolled in the register of registered graduates, it was decided to determine the percentage of graduates who had degree from the Marathwada University.

Table 2
PERCENTAGE OF MARATHWADA GRADUATES
WHO ENROLLED THEIR NAMES IN THE REGISTER OF REGISTERED
GRADUATES

	Yes	No	No Information
Graduates	.94	.03	.03
Arts	.95	.01	.04
Science	.98	.00	.02
Commerce	.93	.06	.01
Education	.88	.11	.01

Looking to the actual situation it can be stated that percentage of graduates from other universities who registered their names in the register was

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negligible. This throws light on the general apathy and reluctance on the part of the graduates to take interest in the universities once degrees are conferred.

Age Distribution of Graduates

The Marathwada University started conferring degrees from the year 1958, which is more than 12 years. A graduate receives a degree on an average at the age of 21 years, then the maximum age of the Marathwada University graduate could be 33 years, provided the graduate received a degree at the age of 21 years.

Table 3
DISTRIBUTION OF GRADUATES ACCORDING OF
THEIR AGES IN YEARS

	<i>Below 25</i>	<i>26-30</i>	<i>31-35</i>	<i>Above 35</i>	<i>No Information</i>
Graduates	.21	.45	.20	.10	.04
Arts	.21	.38	.25	.14	.03
Science	.26	.54	.19	.01	.00
Commerce	.28	.54	.10	.01	.07
Education	.03	.36	.18	.33	.10

Birth Place of Graduates

Graduates were requested to tick mark in a suitable place corresponding to the name of district in which they were born. It was found that a majority of graduates of Marathwada University were not born in Marathwada region.

Last Degree Obtained

Since the universe of investigation consisted of graduates, the minimum degree implied was either B. A. or B. Sc. or B. Com. However, a graduate could have improved his qualifications by passing out different degree examinations. Thus a B.A. could have obtained a degree of M. A. and further more a degree of Ph. D. On the other hand a B. A. might be interested in education and might have secured a degree of B. Ed. These considerations led us to search for the latest degrees of graduates.

Table 4
LAST DEGREES OBTAINED BY GRADUATES

No Inf.	B. A.	B. Sc.	B. Com.	B. Ed.	M.A.	M. Sc.	M. Com.
.03	.25	.13	.13	.21	.06	.07	.04
M. Ed.	LL. B.	LLM.	Ph.D.	Other	Total		
.02	.00	.03	—	.03	1.00		

Present Activity

The graduates were requested to supply information on the nature of their present activities (Table 5).

Table 5
DISTRIBUTION OF GRADUATES ACCORDING TO THEIR ACTIVITIES

	Further Education	Training	Searching for Job	Helping in Household	Any Other	No Information
Graduates	.10	.10	.14	.14	.29	.23
Arts	.10	.15	.19	.15	.21	.20
Science	.22	.05	.12	.23	.16	.22
Commerce	.10	.15	.19	.15	.21	.20
Education	—	—	—	—	.56	.44

Employment and Unemployed

Graduates were asked a simple question : "Are you employed?". Only two possibilities "Yes" or "No" were available for answer (Table 6).

Table 6
DISTRIBUTION OF GRADUATES ACCORDING TO EMPLOYMENT

	Yes	No	No Information
Graduates	.71	.21	.08
Arts	.66	.34	.00
Science	.82	.18	.00
Commerce	.69	.11	.21
Education	.57	.00	.43

Employment Exchange or University Guidance Bureau

Information was obtained whether the graduate had registered his name in the Employment Exchange or the University Guidance Bureau. Regarding the usefulness of registration, a simple question, "Did the

registration prove helpful" was asked to find out the percentage of graduates who secured jobs through the Employment Exchange or the University Guidance Bureau. An examination of the data collected showed that replies of graduates are not consistent. For example, it was noted that 54 per cent of graduates registered their names in the Employment Exchange or the University Guidance Bureau. However, if we consider the percentage of graduates who benefitted from the registration and who did not benefit, these percentages add to 61. There is a difference of 7 per cent between the two values. Some of the questionnaires revealed the fact that those who did not register their names also replied in negative to the question, "Whether they benefitted from the registration or not?" In fact these students should have tick-marked in the column 'not applicable'.

Number of Applications Made

A question was asked : "how many times have you applied for a job after graduation"? For answer, columns were provided from 0 to more than 10 times (Table 7).

Table 7
NUMBER OF APPLICATIONS SENT BY GRADUATES

	<i>Zero times</i>	<i>One Time</i>	<i>2 to 5 Times</i>	<i>6 to 7 Times</i>	<i>More than 10 Times</i>	<i>No Information</i>
Graduates	.15	.17	.24	.11	.13	.20
Arts	.20	.20	.25	.10	.10	.15
Science	.96	.27	.23	.17	.16	.11
Commerce	.22	—	.31	.05	.21	.21
Education	.17	—	.18	—	—	.65

Waiting Period for the First Job

Information was asked from the graduates regarding the waiting period for the first job since their last degree (Table 8).

Table 8
WAITING PERIOD FOR GRADUATES

	<i>Below 6 Months</i>	<i>6 to 12 Months</i>	<i>Above 1 Year</i>	<i>Un-employed</i>	<i>Already Employed</i>	<i>No Information</i>
Graduates	.36	.13	.12	.08	.02	.29
Arts	.26	.19	.10	.15	.06	.24
Science	.60	.06	.12	.05	—	.17
Commerce	.21	.15	.22	—	—	.42
Education	.16	.18	—	—	—	.66

Time of the First Job

A question was asked : "When did you get your first job ?" The expected replies to this question were : while graduating, while postgraduating, after postgraduation, not yet employed.

Table 9
TIME OF THE FIRST JOB OF GRADUATES

	<i>While Graduating</i>	<i>After Graduation</i>	<i>While Post-graduating</i>	<i>After Post-graduation</i>	<i>Not Yet</i>	<i>No Information</i>
Graduates	.14	.57	.02	—	.11	.16
Arts	.31	.39	—	—	.25	.05
Science	.06	.76	.06	—	.06	.06
Commerce	—	.69	—	—	—	.31
Education	—	.34	—	—	—	.66

Nature of Employment

A question was put, "What is the nature of your present employment?" Table 9 shows the nature of employment of graduates.

Table 9
NATURE OF EMPLOYMENT OF GRADUATES

	<i>School Teacher</i>	<i>Clerk</i>	<i>College/University Teacher</i>	<i>Administrative</i>	<i>Professional</i>	<i>Not Employed</i>	<i>Other</i>	<i>No Information</i>
Graduates	.38	.13	.10	.09	.08	.06	.04	.12
Arts	.49	.15	.10	—	.10	.05	.05	.06
Science	.34	—	.16	.17	.05	.12	—	.06
Commerce	.20	.38	—	.11	.10	—	—	.21
Education	.41	—	—	.16	—	—	—	.43

Type of Employer

A question was asked about the type of employer.

Table 10
EMPLOYERS OF GRADUATES

	Central Government	State Govern- ment	Semi- Govern- ment	Local Body	Private	Not Appli- cable	No Infor- mation	Other
Graduates	.06	.17	.19	.17	.12	.15	.12	—
Arts	—	.11	.23	.06	.25	.29	.06	—
Science	.06	.26	.22	.23	.06	.05	.06	.06
Commerce	.21	.11	.09	.23	.05	.10	.21	.00
Education	.00	.22	.01	.34	—	—	.43	—

Present Salary

The graduates were asked to tell their salary inclusive of all allowances. Table 11 gives the distribution of graduates according to salary.

Table 11
DISTRIBUTION OF GRADUATES ACCORDING TO SALARY

	Below Rs. 250/-	Rs. 250/- to 500/-	Rs. 500/- to 750/-	Above Rs. 750/-	Not appli- cable	No Infor- mation
Graduates	.43	.37	.08	—	—	.12
Arts	.39	.45	.11	—	—	.05
Science	.49	.33	.12	—	—	.06
Commerce	.51	.28	—	—	—	.21
Education	.18	.38	—	—	—	.44

Job Satisfaction

Graduates of the Marathwada University were requested to tick one of the following three answers : (i) Yes, (ii) No, (iii) Not applicable, according to the fact in reply to the question : "Are you satisfied with your present job ?" Majority of the graduates were found to be dissatisfied. The graduates who were not satisfied with their jobs were requested to tick reasons for dissatisfaction. The reasons given for dissatisfaction ranged between 'no scope', 'poor salary', 'bossism' and 'non-cooperation'. However, a majority did not give any information.

Usefulness of Degree

Information was collected from the graduates whether the knowledge secured at the time of degree was found useful by them. The proportion of graduates who regarded the degree useful was around .87.

Job Satisfaction and Nature of Employment

Consider the following table, obtained from the data.

<i>Nature of Employment</i>	<i>Are you satisfied with your job ?</i>	
	<i>Yes</i>	<i>No</i>
Administrative	28	32
Clerical	25	56
Teacher in School	147	166
Teacher in College	48	35

Can we say that job satisfaction did not depend on the nature of employment? The χ^2 test showed that at 5 per cent level of significance the satisfaction in a job depended on the nature of employment.

Job Satisfaction and Helpfulness of Degree

Consider the following table derived from the data.

<i>Are you satisfied with your present job ?</i>	<i>Degree is helpful to you or not ?</i>	
	<i>Yes</i>	<i>No</i>
Yes	261	13
No	232	53

The χ^2 test showed that at 5 per cent level of significance the data is insignificant. Satisfaction or dissatisfaction with one's job did not affect one's opinion about its helpfulness.

Lack of further scope and poor salary were two reasons for dissatisfaction.

Salary and Type of Employment

The following data was obtained :

<i>Type of Employer</i>	<i>Salary</i>		
	<i>Below Rs. 250</i>	<i>Rs. 251-500</i>	<i>Rs. 501-750</i>
State Govt.	4	120	17
Semi-Govt.	9	174	11
Local Body	9	46	20
Private	5	75	33

The χ^2 test showed that the data is significant at 5 per cent level of significance. Salaries paid to employees depended on the type of employer.

Salary and Class at the Degree

The survey gave the following data on the characteristics of scales of salary and the class obtained at the last degree examination.

Class Obtained	Salary		
	Below Rs. 250	Rs. 251 to 500	Rs. 501 to 750
II Class	11	216	62
Pass or III Class	21	210	18

The χ^2 test showed that the data is significant at 5 per cent level of significance. The salary drawn depended on class obtained at the degree examination.

Reasons for Unemployment and Nature of Employment

The following data was obtained in the survey. Graduates specifically stated reasons for unemployment and the nature of work they were engaged in.

Nature of Employment	Reasons for Unemployment		
	Shortage of Jobs	Caste	Influence
Administrative	9	14	7
Clerical	16	12	16
Teaching in School	47	61	23
Teaching in College	21	14	17

The χ^2 test showed that the given data is significant at 5 per cent level of significance. Reasons for unemployment due to graduates depended on the nature of their employment.

Reasons for Unemployment and Employment Status

The data was obtained in the survey. Graduates pointed out reasons for unemployment and also whether they were employed or not. The χ^2 test showed that the data is not significant at 5 per cent level of significance. Graduate's reasons for unemployment did not depend on the fact whether he was employed or not.

Reasons for Unemployment and Qualifications

Graduates stated the faculties of their degree and also pointed out

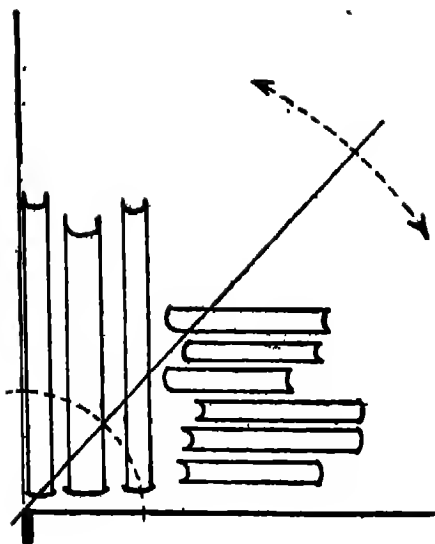
reasons for unemployment, as shown below :

<i>Educational Quali- fications</i>	<i>Shortage of Jobs</i>	<i>Reasons for Unemployment</i>		
		<i>Caste</i>	<i>Religion</i>	<i>Influence</i>
B.A.	37	35	13	9
B.Sc.	17	12	7	21
B.Com.	6	10	6	6
B.Ed.	34	23	6	15

The χ^2 -test showed that the data is significant at 5 per cent level of significance. Reasons of unemployment due to graduates depended on their educational qualifications.

Reasons for Unemployment

Graduates stated their age and reasons for unemployment. There were three age-groups : (i) below 25 years, (ii) 26 to 30 years, and (iii) 31-35 years. The reasons given for unemployment were : shortage of jobs, domestic difficulty, caste, religion and influence. The χ^2 test showed that data is not significant at 5 per cent level of significance. Reasons for unemployment due to graduates did not depend on their age. \square



Book Reviews

Social Class and Ethnic Group Differences in Learning to Read

Victoria Seltz, International Reading Association, Newark,
Delaware, 1971, 1977, pp. viii+35

IN THIS monograph, the author focuses on the research about social class and ethnic group differences in learning to read. Unlike the acquisition of language, the acquisition of reading depends, for the most part, on a well-planned, purposeful, and systematic instructional effort. Since a big share of reading failures is devoured by the lower socio-economic and ethnic minority groups, this title in IRA's series on research in the development of reading has done a good job by providing an analysis of the reliable and well documented relationship among reading acquisition, social class and ethnicity.

One of the most replicable findings in reading research is that children from lower-class homes perform more poorly on measures of reading competence than do children from economically advantaged backgrounds. Such a result is obtained in studies of effects of variations in educational opportunities. While the relationship between social class and acquisition of reading skills is a well documented one, the explanation for this rela-

tionship is a source of considerable debate. Both genetic and environmental factors have been suggested to account for the relationship between socio-economic status (SES) and reading. One should not expect that the results of either genetically or environmentally oriented studies would provide evidence which would lead to an either/or choice between environmental and genetic explanations for social class differences. Much of the research on social class differences in reading has focused upon documenting the existence of such differences. Intervention procedures in the form of head start programmes have been attempted to compensate the performance of low-income children.

In general, there is a sense of pessimism in many of the reports of the effects of large-scale intervention programmes. A common conclusion is that such programmes can do little to alter the inequalities in reading achievement but a contrasting research strategy by Weber tells a different tale. The positive results reported in this study may be due to the greater duration of the intervention project in comparison with those examined in earlier intervention studies, or they may be due to the fact that the intervention has involved relatively fewer children and that the programme has been on a more manageable scale. Seitz is of the opinion that much of the research of the population differences in reading—particularly the research involving large-scale intervention programmes—has been methodologically weak, although it has often been widely publicized. It is important that the existence of this research should not lead investigators to dismiss the potential significance of continued study of intervention methods or to overlook the less widely publicized, more promising, research which does exist. In addition to field studies of SES differences in reading, laboratory research also exists. In general, experimental studies have examined specific motivational and cognitive factors which are postulated to affect the reading process and which also appear to exist in different proportion in differing SES groups. A positive feedback loop may, therefore, be established in which the teacher's higher expectations also influence the children's expectations.

In addition to the differences in academic expectations, a number of differences in linguistic development have been shown to be correlated with SES membership. Such linguistic differences may also play an important role in the differences in reading acquisition across social classes. It is likely that the reading problems of the low-income child who belongs to an ethnic minority may involve additional linguistic and motivational considerations beyond those which need to be considered for the low-income child who is not also a member of a socially defined minority. Dialect differences have been documented in choice of vocabulary, in

pronunciation, and in grammar. Among those theorists who believe that dialectical differences are an important source of cognitive difficulty for children who are learning to read, it is generally agreed that grammatical differences probably provide the most important source of confusion. Such grammatical variations include a number of morphological and syntactic differences between standard and non-standard speech.

Morphological differences include the absence of possessive and plural markers (e. g. John dog for John's dog and three boy rather than three boys). Also 'John going' instead of 'John is going', i. e. deletion of the copula is the normal practice. Many theorists have pointed out that the attitudes of both the child and his teachers regarding dialect may be of much greater significance in producing reading failure than cognitive factors involving mismatch of oral language and written material. However, at present there is no solid evidence regarding either cognitive or motivational effects of dialectical differences upon reading acquisition.

Out of the proposed three methods of teaching the child who speaks non-standard English (the first being teaching standard English first ; the second, permitting children to read existing materials, using their own pronunciation, and the third, the use of dialect readers), the first will be the easiest for the teachers but most difficult for the children. The second would be the easiest for the children but difficult for the teachers. The third is similar to method two but is only different in the sense that it involves additional investment in special reading materials and may not even have parent acceptance.

Since the research concerning the significance of dialect for reading is scanty and inconclusive, classroom observation by persons with expert knowledge of the dialect may be helpful in determining whether or not experimental manipulations are advisable or whether motivational and social factors alone are sufficient to account for the generally poorer reading performance of the child who speaks a non-standard dialect.

PRAMILA AHUJA



Reshaping our School Science Education

Edited by Narendra Valdiya and J.S. Rajput, Oxford and IBH Publishing Co.,
New Delhi, 1977, Rs. 15.00

COMPILATION of an anthology of scholarly and research articles on an international level always poses difficulties. This is more so when the

contribution of our compatriots in the field of interest is rather limited. While the thoughts of Tagore and Gandhiji on education have received widespread appreciation at home and abroad and are still found relevant to our contemporary problems, we are yet to develop an original and indigenous approach to the emerging problems of science education in the country. Vaidya and Rajput have drawn our attention to this problem by bringing out the anthology, *Reshaping Our School Science Education*.

It is now widely believed that even under the general framework of liberal education, science education should have a well defined objective of transferring fundamental skills like literacy and numeracy to our new generation of learners. Most of the authors have highlighted this point by emphasizing the process approach in science teaching, where the science teacher is expected to teach his pupil how to "go from the known to the unknown". The situation in India in this context has been critically reviewed by Walter R. Brown :

Science education at the pre-college level in modern India is an intriguing blend of much of the best and some of the worst science teaching from all over the world. American teaching methods can be seen being applied to a basically British curriculum, using Russian-built equipment. In another area, a Russian style program is taught by teachers trained in the British fashion, using equipment developed with American help. American, British, and Russian textbooks and library books are used indiscriminately.

While any educationist in India will vouch that such a sweeping statement is not only uncharitable but also largely untrue, there is no denying the fact that in our over-enthusiasm to keep pace with the new science curricula developed in the advanced countries in the post-sputnik period, we tried to imitate their curriculum-developers in a very mechanical and altogether wrong fashion without taking into account our constraints. It is heartening to note that the editors gave V. N. Wanchoo an opportunity to make the real position somewhat clear in his article, 'Some Current Issues in Science Education', where he states :

However, it appears to be a fact that curriculum development in science, which is actually a research undertaking, is unfortunately an opinion-oriented process in the country in which needs, interests and maturity levels of students at different class levels are not at all taken into consideration. Consequently, syllabi in science subjects prepared by experts, and textbooks, copied from foreign countries, do not

serve much purpose because these materials are never tried on the population for which they are meant.

The editors would have done well if they had highlighted this crisis and reflected the positive thinking of our scholars on reversing the above trend.

The anthology, which contains 30 articles distributed over six sections, offers an opportunity to a wider circle of science educators and students of teachers' training colleges to get acquainted with the various aspects of science education in a single collection. However, without going into the comparative merit and relevance of the articles selected, one feels on reading the anthology that the contribution of Indian authors could have been more representative.

Save for a few notable exceptions, most of the articles by Indian scholars are related to very narrow and specific areas of interest. As the findings of these studies are very tentative in nature, the inclusion of some of them in the anthology has definitely adverse effects on the quality of the book. The problem posed to an Indian science curriculum-developer by the wide gap in terms of human and material resources between a few rich public schools and the vast majority of the poor rural schools is of an unique nature. Curriculum has always been developed for these favoured few, and the problems of rural science education has been grossly neglected. This bias of our elitist society in favour of an 'each according to his means' policy on science education in schools has unfortunately not been reflected in any of the papers included in the anthology.

The editors chose the following sub-titles for the six sections of the anthology :

- A. Some Problematic Descriptive Aspects of Science Education in India.
- B. The Nature and Spirit of Science.
- C. The Methodology of Instruction in Science (Some Contemporary Attempts).
- D. The Modification of Science Teacher Behaviour.
- E. Research in Science Education.
- F. Other Perspectives in Science Education.

As the scope of some of the sections overlap to a large extent, the rationale for the above classification is not clear. In some cases, for example, in Section A, where the scope of a selected articles is expected to be confined to the Indian scene, one comes across the title, "What can science contribute to the liberation education of all children", an interesting

exposition of global appeal by J. Darell Barnard. Similarly, the paper, "Scientific Attitude—Its Development and Assessment" by Pritam Singh should have been included under 'Research in Science Education' rather than under the 'Nature and Spirit of Science'.

While it is practically impossible to review the articles individually in the limited space, it would not be out of place to suggest that some of them deserve special mention in the light of the current problems in science education. Kenneth D. Loose in "Developing Inquiry Skills in Science Teaching" and J. K. Sood in "Teaching Science through Discovery" highlight the importance of promoting 'understanding' in contradiction to 'rote memorization' in science teaching. David Elkind in "Piaget and Science Education" and Shib K. Mitra in "Programmed Learning and Science of Teaching" equally efficiently elaborate how "Psychology has developed a fairly articulated theory of learning based on very careful observations in the laboratory". J. K. Shukla in "Need for Self-Directed Change in Teacher Education" and J. J. Koran, Jr. in "The Influence of Three Variables on Science Teacher Behaviour" in their own ways come to the same conclusion that "we can identify the skills a science teacher must have, both verbal and non-verbal, and design ways to achieve these skills through training". J. S. Rajput and N. Vaidya in their article, "The Individually Accelerated Science Teacher Education Project" pinpoint the urgency of our science teachers' acquiring the necessary skills to play the key role of science curriculum-developer at the grassroot level.

In spite of the misplaced rhetorics in the lengthy introduction, the editors deserve all praise for bringing out the anthology at a time when the science teachers and science curriculum experts throughout the country are engaged in giving shape to the new national pattern of school education, where the teaching of science up to the secondary level has been given unprecedented impetus.

A. K. JALALUDDIN



Teacher Policies

Director of Information, OECD, Paris, 1976,
pp. 160, \$ 6.00, £ 2.70, F 24.00

THE BOOK under review is the outcome of the OECD countries' conference on 'Teacher Policies' held at Paris in November 1974. Its major focus was on examining the changing roles of school teachers, its implications in terms of tasks, training, status, resources and the new policies to suit the changing role and commitment of the educational world of the 1980s. A sort of inventory of national educational innovations compiled on behalf of OECD by the member countries for over four years served as background material for deliberations on teacher policies. A brief analysis of the inventory may not be out of place here. Of these, a number of studies pertain to the role of teachers in innovative schools in the USA, the UK, France and Sweden; to research and innovations in schools and teacher training in Sweden, France, Belgium, the UK, the USA and Japan; to new patterns of Teacher Training (initial and continuing) in the UK, the USA, Belgium, France, Sweden, and Canada; to new media and technology in the USA, and France; to professionalization of teachers in the USA and the UK; to career patterns and occupational mobility in Germany, and a host of other areas like recruitment of teachers in Sweden, class size and pupil performance in the UK, working conditions of teachers in Sweden, staffing patterns and costs in alternative educational futures in the USA, curriculum development in the UK and France, teachers and school buildings in Sweden, and teacher centres and relations between universities and teacher training in the UK, and the USA.

Broadly speaking, the report is divided into three sections, viz. the opening addresses, trends and issues, and conclusions; the main thesis being 'Teacher Policies' for the 1980s. The keynote addresses hint at close and strong ties between school, home and community, on the one hand and the opening up of the school to the outside world losing all vestiges of its traditional isolation, closure of temporal and special institutions, in the process of life-long education, on the other. To meet this objective, a number of trends and burning problems on teacher-training have been examined threadbare in the report so as to make certain positive suggestions for improvement. The most important, among others, pertain to the imbalance of teacher requirements and training, feminization of the profession, status of teachers, cost and planning, professional mobility and the renovation of career patterns, working conditions, new human, material and management resources to help teachers in their

task. New standards for teacher education in its totality, continuing and recurrent teacher education, polytechnization of teacher training, etc. The concluding section of the report includes the recommendations made by the four working groups and a policy statement on teacher education for the next decade.

A number of recommendations and observations made in the report have direct relevance with teacher education in our own country. Notably, certain research projects, as in many OECD countries, are now primarily focussed on the teacher's role, particularly on his personal relationships in the school and also in the wider context in which he works in the community. Similarly, because of the so-called innovations in education, teachers quite often suffer from anxiety neurosis while undertaking new responsibilities so much so that even experienced teachers feel the lack of confidence in new situations. As a result, a large-scale thinking has been going on in our own situation, as in other countries, regarding the creation of a representative range of profiles and models of the teacher's new role and corresponding reorganization of the professional preparation of teachers. Thus, in line with the new age, there has occurred a considerable thinking and exchange of ideas on having a sort of new types of integrated, often multi-technic establishments in which training might be more effectively offered not only for teachers but also for other professions with possible provisions of bridge courses linking the professional world during the initial and even inservice training stages. Our new model of education, commonly known as the 10+2+3 pattern, envisages academic as well as professional mobility both in horizontal and vertical directions. It seems that the OECD countries, while discussing the internal and external professional mobility, wanted the teachers to have a kind of portable qualifications to help them adapt easily to a new vocation outside the school and also to different stages of education in schools. This, in turn, makes sufficient room for concepts like deschooling, life-long education, non-formal education involving optimum use of a variety of human, material and technological resources, and cooperative inter and intraprofessional efforts to make education a sort of socio-professional network in which health, welfare, education and profession, all would go together. This also entails a large-scale utilization of the local community resources, on the one hand, and of the variety of media, on the other, to make education more meaningful and profitable.

Improving standards of teacher education has been one of the major focus of this conference. In that, it recommended improvement in selection of student teachers, adoption of flexible structures to meet the objective of a planned life-long training involving preservice and inservice education,

Initial training, if proposed, should provide each candidate with a sort of cognitive style and teaching style, coupled with capacity for great tolerance to obviate frustration owing to continuous change and innovations in the educational system. Besides, practical experience in the form of school practice, social experience, direct contact with life and initiation into research as essential parts of the initial training may contribute to the student-teacher's search for self-determination and self-evaluation which would, in turn, make the beginning of his continuing training and initiate him into the philosophy of education and understanding of his own role in the development of the individual and the society. The development of institutions like National Council for Teacher Education, State Boards of Teacher Education, Continuing Education Centres, etc. in our own situation aims at the objectives, more or less, worked out for the OECD countries. Similarly, cost and benefit analysis of teacher preparation and manpower planning as reported by the conference for its member countries have also become a source of research in our situations. Therefore, the book under review contains a lot of material relevant to teacher education system in our own country and for that matter, it is open for universal application.

Prima facie, the report offers a number of potential areas for research. It also suggests new angles in the preparation of teachers and other professional workers to suit the fast developing scientific and technological age besides aiming at maintaining proper link with the local environment. The book is free from the tedious technical jargon of words and phrases and in that way tries to convey in simple language the main thesis of the work. The over-all approach and impression created by this work is that the task of professional preparation of teachers is of an urgent consequence in most of the countries of the world. The book is naturally of great interest to all those concerned with the cause of teacher education and, in turn, education in general. The style of writing is lucid and meaningful. The paperback get-up is beautiful and luring. The printing and editing has been nicely done to offer a sort of smooth reading. The topics discussed are of great interest to the educational world.

The book makes an excellent contribution to the future role of teachers. It makes a tangible addition to the stock of books on teacher education much on the same standard as UNESCO's *Learning To Be*. The three dozen companion volumes which formed the background material for the production of 'Teacher Policies' offer a sort of ocean of information in educational development, national policies and innovations. Read together, they seek to offer a comprehensive system and thought on education for future planners, administrators, teachers, researchers and other categories

of personnel concerned with general as well as professional education of the future generations. However, the book may be a disappointment to the orthodox educationists whose jaundiced eye only finds perennial virtues in a traditional system. On the whole, the book contains certain great truths which could stimulate a lot of research in education and hence it seems to be a must for the library shelves of educational and research institutions in our country and elsewhere.

D. N. KHOSLA □

Journal of Higher Education

Published by the University Grants Commission to promote scholarly study, as well as discussion, of contemporary problems and policies in higher education.

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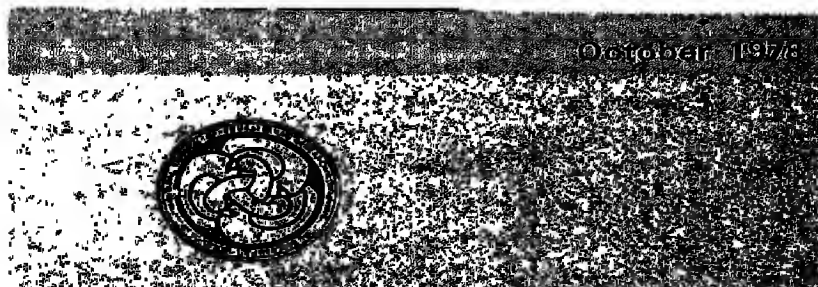
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Indian Educational Review

RESEARCH JOURNAL



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PURPOSE : *Indian Educational Review* is published quarterly in January, April, July and October, by the National Council of Educational Research and Training, New Delhi. The purpose of this journal is to provide a medium for dissemination of educational research and exchange of experience among research workers, scholars, teachers and others interested in educational research and related fields and professions.

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1. Papers that contain original thinking in education or educational research.
2. Papers that make a significant contribution towards developing a theory.
3. Papers that summarize and discuss an outstanding study or a piece of educational research.
4. Papers that review significant research in important areas.
5. Letters to the Editor on important research problems.

The emphasis is on categories 2, 3, 4 and 5. Ordinarily, a paper is not accepted if it has appeared in print or in any form elsewhere. Exceptions may be made for contributions which the General Editor considers should be made known to a wider public. In such cases a copy of the publication in which the paper has appeared earlier should be sent with it.

Manuscripts sent for consideration should be typed double-spaced on one side of the paper only. References in the text to the work of other researchers should be made by giving the name of the researcher, and the year in which this research was published, in round brackets and *not* in the form of serial numbers which connect with the list of references at the

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Educational Planning in ECAFE Countries

R.R. KHAN

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This paper attempts to study the magnitude of the problems of educational planning in ECAFE countries—its present demand and future requirements for the first two levels of education, e.g. at primary and secondary levels respectively, for the period 1965-1980 in respect of: (i) the size of school-going population, (ii) the number of teachers required, (iii) the number of schools required, and (iv) the finance required.

INTRODUCTION

THE IMPORTANCE of educational planning in the context of economic, social and cultural development of a nation needs no stress. Its need is being realized more and more by increasing number of countries at all stages of developments but seems particularly urgent for less developed world which is attempting to clear the backlog of illiteracy and inadequate schooling.

Nevertheless, many countries in the ECAFE region, undergoing excessive rates of population growth embarked upon a programme to

*The author is indebted to Dr. J. R. Rele, Dr. (Smt.) V. Narain and Prof. K. N. Tirodkar for their useful comments on this paper. Thanks are also due to Smt. S. R. Kulkarni for her helpful suggestions in preparing this paper.

provide universal free and compulsory education to all their school-going children up to the primary level at least. This has accelerated the expansion of education in a large number of countries of the region. The student enrolments increased tremendously, the expenditure on education shot up at a high rate, the educational profile and potential productivity of manpower improved. Education emerged as the principal tool of social and economic development.

Despite this great expansion, a parallel problem of population growth has led to an increase in the aggregate number of illiterates in ECAFE region. This seems to be an alarming challenge to the present educational system in these countries which is likely to be exposed to certain crises such as shortage of funds, teachers, classrooms—a shortage of everything except students when population growth is tremendous. Today, many countries are in the grip of such a crisis.

PRESENT SITUATION

The Educational Structure

The educational system in the ECAFE region vary in their structure, levels and stages in which they are divided. The most common age range at which children are normally accepted to formal schooling differs from country to country; however, the most common ages of entry are 6 and 7 years as revealed from Table 1. Table 1 shows the age range at which children are usually admitted, for the first two levels of education and the enrolment ratios (number of children attending school per hundred school age population) for a large number of countries in the ECAFE region.

A perusal of Table 1 gives some unacceptable observations. For instance, in Burma, Taiwan, Philippines and Singapore the rates are well above 100 per cent which is impossible. It has been noted that there is no one-to-one correspondence between the age ranges of the pupils enrolled and the age-group used in the denominator for the comparison. Due to the restriction for minimum age for compulsory primary education the reported age at the time of admission is higher than actual age. This leads to an increase in the numerator—those attending school and that the denominator is fixed—those available for schooling.

This leads to ratios of over 100 per cent in certain cases at the first level of education.

EDUCATIONAL PLANNING IN ECAFE COUNTRIES

Table 1
AGE RANGE AND ENROLMENT BY LEVELS OF EDUCATION

Country	Grade and Age Limit		Enrolment Ratio around 1965	
	1st level	2nd level	1st level	2nd level
Burma	I—IV 6—9	V—X 10—15	106	17
Cambodia	I—VI 6—11	VII—XIII 12—18	72	8
Ceylon	I—AV 5—10	VI—XII 11—17	93	43
Taiwan	I—VI 6—11	VII—XII 12—17	104	37
India	I—V 6—10	VI—XII 11—17	76	22
Indonesia	I—VI 6—11	VII—XII 12—17	80	10
Iran	I—VI 7—12	VII—XII 13—18	60	17
Rep. of Korea	I—VI 6—11	VII—XII 12—17	98	33
Laos	I—VI 6—11	VII—XII 12—18	37	2
Malaysia	I—VI 6—11	VII—XIII 12—18	90	25
Nepal	I—V 6—10	VI—X 11—15	29	5
Pakistan	I—V 6—10	VI—XII 11—17	39	14
Philippines	I—VI 7—12	VII—X 12—16	107	36
Singapore	I—VI 6—11	VII—XIII 12—18	105	38
Thailand	I—VII 7—13	VIII—XII 14—18	77	13
Rep. of Viet-Nam	I—V 6—10	VI—XII 11—17	73	14

Source : Unesco Regional Office for Education in Asia; *Progress of Education in the Asian Region : A Statistical Review*, Bangkok, 1969, Table A-10, pp.95-98

Data regarding enrolment rates of maximum number of countries of the ECAFE region are available for the year 1960 in order to study the magnitude of educational problems and current situation prevailing in the region. The ECAFE countries are classified on the basis of enrolment ratios of 1960 into three groups*—educationally backward, intermediate and satisfactory. The countries included within each group are as follows :

Group A : Afghanistan, Laos, Nepal and Pakistan.

Group B : Burma, Cambodia, India, Indonesia, Iran, Viet-Nam and Republic of Thailand.

Group C : Ceylon, Philippines, Singapore, Republic Korea, of Malaysia and Taiwan.

Table 2 gives the average enrolment rate for each group at 4 points of time. It can be seen from the Table that there is extremely wide variation among the three groups of countries of the ECAFE.

Table 2
SCHOOL ENROLMENT RATES FOR THE FIRST LEVEL OF EDUCATION

<i>Year</i>	<i>Group A</i>	<i>Group B</i>	<i>Group C</i>
1950	14.6	45.3	81.7
1955	18.8	57.6	83.9
1960	22.0	67.0	94.1
1965	29.2	77.1	96.8

Source : Unesco, op. cit., pp. 95-98

It is noted from Table 2 that Group C countries are far ahead of Group A countries in terms of enrolment rates. The data presented in the Table are only intended to provide indication about the progress achieved in the three groups with regard to the proportion of school-age population which is being absorbed by the national educational system. However, an analysis of Table 3 will give a fair idea about the progress of education in different countries in these groups over a period of time. Table 3 indicates that all the countries have gone to the higher category of enrolment ratio except Thailand. But in case of Thailand the lower ratio is due to definitional changes. As a matter of fact in Thailand the first level of education

*Group A comprises countries with enrolment rate 40 per cent

Group B comprises countries with enrolment rate between 40-80 per cent

Group C comprises countries with enrolment rate 80 per cent

EDUCATIONAL PLANNING IN ECAFE COUNTRIES

till 1962 comprised the first four grades. In 1962 the duration of first level was extended to 7 years, hence enrolment ratio calculated now with reference to age-group 7-13 instead of 7-10 appears lower.

Table 3

PROGRESS OF ENROLMENT RATIOS AT THE FIRST LEVEL OF EDUCATION

<i>Enrolment Ratio</i>	<i>Around 1960</i>	<i>Around 1967</i>
90	Ceylon (C) Philippines (C) Singapore (C) Korea (C)	Burma (B) Ceylon (C) Taiwan (C) Malaysia (C) Philippines (C) Singapore (C) Korea (C)
80—89	Taiwan (C) Malaysia (C) Thailand (B)	Viet-Nam (B)
70—79	Burma (B)	Cambodia (B) India (B) Iran (B) Thailand (B)
60—69	India (B) Viet-Nam (B)	Indonesia (B)
50—59	Cambodia (B) Indonesia (B)	
40—49	Iran (B) Afghanistan (A) Laos (A) Nepal (A) Pakistan (A)	Afghanistan (A) Laos (A) Nepal (A) Pakistan (A)

Note : 1. Afghanistan and Laos are omitted for further discussion because of non-availability of age distribution of population.

2. Letters within brackets indicate the Group (A,B,C) in which the country is placed as per our classification at the base year 1960.

Table 3 shows that enrolment rates in most of the countries are rising. Although the absolute number of adult illiterates in the region increased from about 307 to 315 million during 1950-60, the percentage in the total population has considerably reduced from about 76 per cent to about 67 per cent.

An analysis of the general features in respect of various hampering factors is presented in order to serve as background against which the needs and prospects of educational development in future may be viewed.

PROBLEMS

Demographic Aspects

The aggregate population of the ECAFE countries is around 2,000 million and is growing at an annual average rate of about 2.2 per cent per annum. The problems of educational planning are vitally related to the problem of population growth, especially when its growth is tremendous.

As a matter of fact, the demographic translation in the ECAFE region is the result of population explosion that is bound to continue until a balance of death rates and birth rates is attained. The result of a high birth rate is transmitted directly to the age structure of population which invariably gives an unfavourable age structure. Table 4 gives age structure of the population of the 15 ECAFE countries.

Table 4
AGE STRUCTURE OF THE POPULATION

Country	Year	15 Years	15-19 Years	60 Years
Australia	1961	20.65	59.21	20.14
Burma	1960	41.30	53.50	5.20
Cambodia	1962	41.80	51.30	4.90
Ceylon	1963	38.26	51.99	11.75
Iran	1966	42.83	47.37	9.80
India	1961	41.10	54.10	4.80
Indonesia	1961	42.10	53.80	4.10
Japan	1965	23.83	64.69	11.48
Rep. of Korea	1966	40.60	51.31	8.09
Nepal	1961	37.12	54.58	8.30
Pakistan	1961	44.50	49.50	6.00
Philippines	1960	45.70	50.00	4.30
Singapore	1970	33.97	55.50	10.53
Taiwan	1966	40.28	52.35	7.37
Thailand	1960	43.20	52.20	4.60

Source : U.N. Demographic Year Book, 1970

The implications of unfavourable age structure of population in terms of economic and social development are well known. Nevertheless, when population is growing at a faster rate, a large part of capital accumulation has to be used just to serve the growing population, leaving little margin for its improvement and welfare activities. The educational requirements of urban population are more than that of rural population. It is, therefore, necessary to consider the extent of urbanization and rate of future growth of urban population while estimating future educational needs.

The urbanization in most of the ECAFE countries is growing at a faster rate. Although the urban population is still a smaller fraction of the total population, it has in recent years increased at a rate about twice that of overall population growth. The difficulty of making appropriate estimate of urban age structure in future years hinders in planning the inputs of education required for urban area separately.

Financial Aspects

With increase in the school-going population followed by the expectation about progress both in terms of quality and quantity, the expenditures are bound to be quite high. Despite the fact, the ECAFE countries, compared to Western nations, suffer from a number of disadvantages with regard to educational finance. Because of certain other urgent demands they are unable to invest a considerable proportion of their GNP on education as is done in Western countries. Further, the high young dependency in the ECAFE region is a major hampering factor in the way of investment in education. Not surprisingly, the GNP per head in Western countries is so high that the amount spent on education per head of the school age population is quite high. While in ECAFE countries only a small fraction of total expenditure is spent on education and expenditure per head is quite low, e.g. France spends 282 and Australia 243 on education per head for the population aged 5-15, Thailand spends 9 and India 7 (all figures for 1965).

It is disheartening to note that in most of the ECAFE countries the public expenditure on education ranged from less than 1 per cent to over 5 per cent of the national income in 1961 as is evident from Table 5.

It can be observed from Table 5 that in 1960 only six countries out of 14 were spending more than 3 per cent of their national income on education. In 1965 the number has increased to 11 countries. This shows that countries in the ECAFE region are relatively spending more on education in the recent past. But from this we cannot jump to the conclusion that per pupil expenditure has increased because the population for which this expenditure is incurred has also increased. Besides, it cannot be said

Table 5
PUBLIC EXPENDITURE ON EDUCATION AS PERCENTAGE OF
NATIONAL INCOME—1960-65

<i>Expenditure on Education as Percentage of National Income</i>		<i>1960</i>	<i>1965</i>	<i>Number of Countries</i>	
				<i>1960</i>	<i>1965</i>
1% or less	Pakistan			1	—
1.1 to 2%	Burma, India, Viet-Nam			3	1
2.1 to 3%	Taiwan, Iran, Singapore Thailand		India, Viet-Nam	4	2
3.1 to 4%	Philippines, Cambodia		Burma, Taiwan, Iran, Korea, Philippines, Thailand	2	6
4.1 to 5%	West Malaysia		Cambodia, Ceylon, Singapore	1	3
5%	Ceylon, Japan, Korea		Japan, West Malaysia	3	2
				14	14

Source : Unesco, op. cit., pp. 152-156

whether this is a real increase in expenditure unless we know about the relative price levels.

Qualitative Aspects

Besides the aforementioned aspects, the qualitative aspects should be given due consideration in assessing the magnitude of the problem in all its facts.

The task of raising the quality of education is a vicious circle in which ECAFE is involved.

Problems of maintaining quality in the face of a vast expansion of student population are numerous. Firstly, teachers' training is not keeping pace with the evergrowing flood of students with the result their classes are growing larger. Table 6 sets out pupil-teacher ratios at the first level of education for 15 ECAFE countries under study.

United Nations has recommended an ideal pupil-teacher ratio, i.e. there should be one teacher per 35 to 40 students in primary level. A compari-

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Table 6
PUPIL-TEACHER RATIO

Country	Year	First Level	Country	Year	First Level
Burma	1967	55	Malaysia	1965	28
Cambodia	1967	50	Nepal	1966	28
Ceylon	1964	28	Pakistan	1966	41
Taiwan	1967	42	Philippines	1963	34
India	1967	52	Singapore	1966	30
Indonesia	1967	45	Thailand	1967	34
Iran	1967	32	Viet-Nam		
Rep. of Korea	1967	60	Rep. of	1966	58

Source : Unesco, op. cit., pp. 137-139

son of ideal pupil-teacher ratio as recommended by UN with the observed data shows that the student-teacher ratio in ECAFE is very high. This is partly because of tremendous growth of school-age population and partly for having a smaller student-teacher ratio in region. However, with the integration of education in the economic plans there seems good reasons to believe that the efforts will be made at least to maintain the present standard.

Secondly, the discontinuation rate at the second level of education is quite high in the region. Table 7 shows discontinuation rate for 15 countries under study. The average discontinuation rate is 13.7 per cent.

Table 7
DISCONTINUATION RATE AT SECOND LEVEL OF EDUCATION

Country	Percentage Per Annum
Group A	
Nepal	16.36
Pakistan	8.76
Group B	
Burma	12.42
Cambodia	16.44
India	9.63
Indonesia	16.67
Iran	13.50
Korea	14.21
Thailand	17.61
Group C	
Ceylon	8.37
Philippines	14.23
Singapore	12.49
Rep. of Korea	12.89
Malaysia	13.07
Taiwan	19.06

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The incidence of discontinuation of education is the highest in countries of Group B and the lowest in Group A. To some extent, this is a wastage which these countries with poor resources cannot afford. The success of an educational system is seen by the measures taken by the educational planners in providing for minimum drop-outs of schools. This is so that the right type of education is provided for the need of the region.

FUTURE DEMANDS : 1965-80

A. Estimates of the Size of the Student Population (1965-1980)

METHODOLOGY : The estimation of the size of the school-going population involves two steps in calculation : (a) To project size of the school-age population ; and (b) to estimate the enrolment ratios.

The projected population of the school-age groups for 1965-80 has been borrowed, whereas the enrolment rates for the future years have been estimated by graphical method (Appendix I). Taking the products of enrolment ratios and corresponding projected figures of school-age population we get the magnitude of school-enrolled population for respective age-groups. As shown in Table 1, the relevant age-groups for two levels of education are different in countries. In order to project the enrolled population consistent with these age-groups the enrolled population projected above was multiplied by the weights derived by Newton's formula (Appendix II). Table 8 gives the estimated figure of the school-enrolled population.

Table 8
ESTIMATES OF SCHOOL-ENROLLED POPULATION (IN THOUSANDS)
1965-1980

		<i>a—Primary Level</i>		<i>b—Secondary Level</i>	
<i>Country</i>		<i>1965</i>	<i>1970</i>	<i>1975</i>	<i>1980</i>
Group A					
Nepal	<i>a</i>	370,982	467,536	579,009	703,887
	<i>b</i>	52,571	67,456	98,170	125,549
Pakistan	<i>a</i>	5803,640	7567,869	9470,785	11175,667
	<i>b</i>	2471,186	8258,510	4766,022	6358,996
Group B					
Burma	<i>a</i>	2000,457	2827,868	3626,669	3842,620
	<i>b</i>	416,055	757,865	1210,422	1628,760

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Cambodia	a	797.835	1145.162	1659.390	1419.096
	b	78.234	141.866	205.596	285.663
India	a	40470.607	58834.852	66709.862	74249.064
	b	19791.564	20972.271	25504.036	29498.860
Indonesia	a	14815.744	15375.748	19998.793	26402.590
	b	1352.640	2465.467	4910.983	7879.809
Iran	a	2268.513	3224.632	4398.886	5666.650
	b	502.143	736.189	1013.134	1452.279
Rep. of Viet-Nam	a	2079.497	3006.208	3527.840	3931.992
	b	409.546	598.588	1079.222	1520.074
Thailand	a	4679.690	5556.073	6369.979	7838.917
	b	443.195	557.203	696.499	870.375
Group C					
Ceylon	a	1745.745	2079.048	2211.269	2257.084
	b	771.686	1015.020	1278.123	1397.226
Philippines	a	5356.192	6284.512	7332.240	8460.936
	b	1124.404	1538.310	1947.680	2405.640
Singapore	a	333.360	347.904	326.656	312.896
	b	86.397	125.107	155.636	191.654
Rep. of Korea	a	5147.128	5515.504	5827.176	6502.976
	b	1369.130	1827.237	1961.114	2750.428
Malaysia	a	1235.426	1448.271	1635.008	1821.192
	b	312.858	428.017	1513.861	620.078
Taiwan	a	2122.232	2185.664	3296.392	2390.656
	b	697.870	991.730	1220.820	1389.650

Source : DTRC, Bombay and ECAFE, Bangkok, *Population Projections for ECAFE Countries, 1960-80*, Bombay, 1969

B. Requirements Concerning Teachers (1965-1980)

METHODOLOGY : To estimate the number of teachers required for the future years, we have to take into account : (i) The number of students who are expected to get enrolled in the school, and (ii) The pupil-teacher ratio. The former is already estimated (Table 8), hence we need only estimates of the pupil-teacher ratio. Nevertheless, pupil-teacher ratios for all the countries under study are available, therefore, estimates of the number of teachers required in the future years may be worked out assuming that pupil-teacher ratio of the latest available years will remain constant. The

estimates tabulated in Table 9 will give the minimum limit of the future requirement of teachers. If more teachers are available than estimated here, there is hope for improving the student-teacher ratio and raise the quality.

Table 9
ESTIMATES OF TEACHERS REQUIRED —1965-1980 (in millions)

Country		Pupil Teacher Ratio	1965	1970	1975	1980
Group A						
Nepal	a	28 (1964)	13.249	16.698	20.679	20.514
	b	17 (")	3.092	3.068	5.775	7.385
Pakistan	a	41(1966)	141.552	184.581	230.994	272.577
	b	28 (")	84.685	116.411	170.215	227.107
Group B						
Burma	a	55 (1967)	36.372	51.407	65.939	69.866
	b	37 (")	11.245	20.483	32.714	44.020
Cambodia	a	50 (")	39.891	57.258	82.969	95.705
	b	30 (")	2.607	4.720	6.853	9.522
India	a	52 (")	778.280	1131.441	1282.881	1427.866
	b	17 (")	1164.209	1233.662	1500.237	1735.227
Indonesia	a	45 (")	284.918	341.683	444.170	586.724
	b	26 (")	52.024	94.826	188.882	303.069
Iran	a	32 (")	70.890	100.769	137.465	177.083
	b	28 (")	17.933	26.292	36.183	51.867
Vietnam	a	58 (1966)	35.681	51.831	60.825	67.793
	b	30 (")	10.501	15.348	27.672	38.976
Thailand	a	34 (1967)	137.638	163.414	187.352	230.556
	b	18 (")	24.621	30.621	38.694	48.354
Group C						
Ceylon	a	28 (1964)	62.348	74.252	78.974	80.610
	b	17 (")	45.393	59.707	75.183	83.189
Philippines	a	34 ('63)	156.946	184.838	215.654	248.851
	b	34 (")	33.070	45.244	57.285	70.754
Singapore	a	30 ('66)	11.112	11.596	10.888	10.429
	b	24 ('66)	3.599	5.213	6.486	7.985

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Korea	a	60 (67)	85.785	91.925	97.119	108.888
	b	37 (67)	37.003	49.384	53.003	74.336
Malaysia	a	28 (65)	44.122	51.724	58.393	65.042
	b	23 („)	13.602	18.609	22 342	26.960
Taiwan	a	42 (67)	50.529	52.039	52.295	56.920
	b	25 („)	27.910	39.670	48.830	55.580

C. Estimates of School Buildings (1965-80)

METHODOLOGY : The number of schools required in the future depends on many factors than the mere size of the school-enrolled population. The lack of detailed statistics is a serious limiting factor when estimating the ratio of schools. The number of school buildings needed in the future may be worked out by assuming a building to student ratio from international experience. The number of primary and secondary schools have been estimated in Table 10 with an average capacity of 80 students per school in case of the first level and 250 students in case of the second level of education. These estimates are of limited value, but they are hoped to be helpful to visualize the magnitude of the problem.

Table 10
ESTIMATES OF SCHOOL BUILDINGS (1965-1980)

(in thousands)

Country		1965	1970	1975	1980
Group A					
Nepal	a	4.637	5.844	7.237	8.798
	b	0.210	0.270	0.393	0.502
Pakistan	a	72.545	94.598	118.384	139.690
	b	9.485	13.038	19.064	25.486
Group B					
Burma	a	25.005	35.342	45.333	48.033
	b	1.664	3.031	4.842	6.515
Cambodia	a	9.973	14.314	20.742	23.926
	b	0.313	0.567	0.822	1.142
India	a	505.880	735.436	833.873	928.113
	b	79.166	83.889	102.016	117.995

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Indonesia	a	105.196	192.196	249.984	330.032
	b	5.410	9.862	19.644	31.519
Iran	a	28.356	40.308	54.986	70.833
	b	2.008	2.948	4.052	5.809
Rep of Korea	a	25.868	37.577	44.098	49.150
	b	1.638	2.394	4.317	6.080
Thailand	a	58.496	69.450	79.624	97.986
	b	1.086	4.060	2.786	3.481
Group C					
Ceylon	a	21.821	25.988	27.640	28.213
	b	3.087	4.060	5.112	5.589
Philippines	a	66.702	78.556	91.653	105.761
	b	4.497	6.153	7.790	9.622
Singapore	a	4.167	4.348	4.083	3.911
	b	0.345	0.500	0.622	0.766
Rep. of Korea	a	64.339	68.943	72.839	81.287
	b	5.979	7.309	7.844	11.001
Malaysia	a	15.443	18.103	20.437	22.765
	b	1.251	1.712	2.055	2.480
Taiwan	a	26.523	27.320	27.454	29.883
	b	2.790	3.960	4.880	5.560

D. Estimates of Expenditure Required (1965-1980)

METHODOLOGY : In making the projections regarding the level of expenditure, two approaches are available : (i) The expenditure on education as a percentage of national income, and (ii) the expenditure per pupil.

Time series data on educational expenditure over a period of time are not available. Lack of good data on national income is also a limitation. Some data regarding cost per student, however, are available (not time series data). Under such circumstances we may adopt the later approach, i. e. to get the estimate of total expenditure on education in future by assuming that the cost per student available for latest year remains constant,

Table 11 gives estimates of expenditure based on the assumption of per cent per pupil expenditure in the national currency as also in US dollars.

Table 11

ESTIMATES OF EXPENDITURE BASED ON A FIXED PER PUPIL EXPENDITURE IN NATIONAL CURRENCY
AS ALSO IN US DOLLARS

Country	Av. per Pupil	(in thousand*)					Exchange Rate US Dollar	(in millions)			
		1965	1970	1975	1980	1965		1970	1975	1980	
Group A											
Nepal	N.A.	—	—	—	—	N.A.	—	—	—	—	—
Pakistan	32	185716.477	242171.489	303065.129	357621.340	0.210	39,000	50,856	63,647	75,100	
(Rupee)	35	261550.871	277058.404	405111.904	540514.673		42,325	58,180	85,070	113,508	
Group B											
Burma	84	88020.106	124404.206	159573.459	169075.315	0.210	18,484	26,125	33,510	35,506	
	96	38693.148	70481.500	112569.246	151474.739		8,125	14,801	23,639	31,809	
Cambodia	906	722838.401	1037516.649	1503407.919	1734170.976	0.0286	20,673	29,673	43,000	49,597	
(Rial)	3867	302531.806	548595.512	195040.350	1104657.738		86,524	15,690	22,738	31,593	
India	31	1254588.818	1823883.521	2068095.731	2301720.984	0.210	263,464	383,015	434,281	483,361	
(Rupee)	64	1266660.115	1342225.369	1632258.336	1887927.901		266,000	281,867	342,774	396,464	
Indonesia	N.A.	—	—	—	—	N.A.	—	—	—	—	
Iran	2780	6306467.808	8964477.349	1222890.419	15753289.224	0.0132	83,245	118,331	161,421	207,943	
(Rial)	5427	2725131.580	3995300.090	5498278.652	7881529.068		35,972	52,738	72,577	104,036	
Rep. of Viet-Nam	1128	2334393.112	3391002.624	3979403.520	4435286.976	0.0166	38,750	56,290	66,058	73,626	
(Piastre)	4479	1834356.175	2681074.935	4833837.120	6808412.520		30,450	44,506	80,241	113,020	
Thailand	284	1329032.073	1577924.902	1809074.092	2226252.484	0.0482	64,069	76,056	87,197	107,305	
(Baht)	1278	56403.184	712105.280	890125.568	1112340.016		27,300	34,323	42,904	53,614	

Group C	N.A.	—	—	—	N.A.	—	—	—	—
Ceylon (Rupee)	105	560300.160	659273.760	769885.200	868398.280	0.255	142.876	16 ² .288	196.320
Philippines (Peso)	N.A.	—	—	—	—	—	—	—	—
Singapore (dollars)	183	61004.880	63666.432	59778.048	57259.968	0.326	19.886	20.755	19.487
Rep. of Korea (Won)	283	20562.438	29775.513	47041.177	44613.74	—	6.705	9.707	12.075
Malaysia (W)	1779	9156740.850	9812081.616	10366546.104	11568794.304	0.0392	35.894	38.463	49.637
Malaysia	4653	6370563.751	8520136.552	9125365.303	12797745.206	—	24.972	33.320	35.770
Malaysia (dollars)	138	164311.711	192620.069	217456.127	242218.536	0.326	53.565	62.794	70.890
Taiwan	252	78840.216	107860.273	129493.123	156259.635	—	25.702	35.162	42.215
New Taiwan (dollars)	741	1572573.921	11619577.024	1627526.472	1771476.096	0.0249	39.157	40.327	40.525
	2458	1715376.258	2437691.020	3000781.459	3415754.783	—	42.712	60.698	74.719
									85.052

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RESULTS

The expected growth in the school-enrolled population, teachers and school buildings by level of education has been given in Table 12 (a), whereas the expected growth in the expenditure is shown in Table 12 (b) separately because data on expenditure are available only for one country out of two in Group A, for six countries out of seven in Group B and for four countries out of six in Group C.

Table 12 (a)

GROWTH OF SCHOOL-ENROLLED POPULATION, NUMBER OF TEACHERS AND NUMBER OF SCHOOL BUILDINGS REQUIRED BY GROUP OF COUNTRIES BETWEEN 1965-1980

	School-enrolled Population (in thousands)			No. of Teachers (in thousands)			No. of School Buildings (in thousands)		
	1965	1980	Percentage growth per annum	1965	1980	% growth per annum	1965	1980	% growth p.a.
<i>First Level</i>									
Group A	6174.6	11879.5	6.16	154.8	293.0	5.95	77.18	148.49	6.15
Group B	67102.3	123845.9	5.64	13831.6	2655.5	6.12	838.77	1548.07	5.63
Group C	15920.0	21745.7	2.43	410.8	570.2	2.58	199.0	271.82	2.44
<i>Second Level</i>									
Group A	2423.7	6484.5	11.16	87.8	234.5	11.13	9.69	25.93	11.17
Group B	22993.9	43135.8	5.84	1283.1	2231.0	4.92	91.97	172.54	5.84
Group C	4362.3	8754.6	6.71	160.6	317.8	6.52	17.44	35.01	6.75

Table 12 (b)

INCREASE IN EXPENDITURE BY GROUP OF COUNTRIES BETWEEN 1965-80

	1965	1980	Percentage Growth
	US Dollars	US Dollars	
First Level			
Group A	39.00	75.10	6.17
Group B	488.67	957.34	6.39
Group C	148.50	187.08	1.37
Second Level			
Group A	42.32	113.50	11.22
Group B	188.64	730.53	19.15
Group C	100.08	201.02	6.72

It is noted from Table 12 that during 1965-80 the percentage growth of school-enrolled population for the first level of education for the countries falling in different Groups, viz. A, B and C, has been 6.16, 5.64 and 2.43 per cent per annum, respectively. The percentage increase in the number of teachers is 5.95, 6.12 and 2.70, whereas the percentage increase in the number of school buildings is seen at 6.15, 5.63 and 2.44. The expenditure is expected to increase by 6.17, 6.39 and 1.73 per cent for the countries in Groups A, B and C, respectively.

At the second level of education, the percentage growth per annum of school-enrolled population in countries of Groups A, B and C is 11.16, 5.84 and 6.7 respectively. Accordingly the requirements of teachers will go up by 11.13, 4.92 and 6.52 per cent per annum respectively. The requirements in the numbers of school buildings is expected to show an increase of 11.17, 5.84 and 6.7 per cent whereas the percentage increase in the expenditure is expected to be 11.22, 19.15 and 6.72 per annum for the countries for which data are available in Groups A, B and C respectively, as observed in Table 12(b).

CONCLUSION

Educational planning should be given due consideration in the economic plans as it has been considered to be an important component for the overall planning of the economic, social and cultural development of a country. The estimates which we have obtained on the assumption that present rate will remain constant show significant increase in the number of teachers, school buildings and expenditure required because of the rapid increase in the school-going population. Even if the quality of education remains the same, the available data on expenditure for 11 out of 15 countries under study show that the ECAFE countries will have to incur additional expenditure to the extent of about 543 million US dollars at the first level of education and about 714 million US dollars at the second level of education just to cope with the rapid growth of their population.

Appendix I
ENROLMENT RATIO

Burma	Cambodia		Ceylon		Taiwan		India		Indonesia		Iran		Korea		Malaysia											
	Year	1st 2nd	Year	1st 2nd	Year	1st 2nd	Year	1st 2nd	Year	1st 2nd	Year	1st 2nd	Year	1st 2nd	Year	1st 2nd										
A			A		A		A		A		A		A		A											
1950	20	—	1950	27	—	1950	89	25	1950	63	13	1950	42	8	1950	39	4	1950	36	4	1950	83	17	1950	61	4
55	26	7	55	48	2	55	89	26	55	80	21	55	50	11	55	53	8	55	30	7	55	86	27	55	74	11
60	71	9	60	59	5	60	93	37	60	100	29	60	62	17	61	59	9	60	43	12	60	94	28	60	86	15
63	75	11	65	72	8	64	63	43	65	100	37	65	76	22	65	80	10	65	60	17	65	98	33	65	90	25
64	77	—	66	74	9				66	100	39	66	77	21	67	63	13	66	65	16	66	100	33	66	92	—
B			B		B		B		B		B		B		B		B		B		B		B		B	
1965	79	14	1970	84	12	1965	94	44	1970	100	47	1970	81	24	1970	71	14	1970	21	1970	10	37	1970	95	28	
70	86	20	75	37	14	70	76	50	75	100	56	75	83	26	75	79	19	75	24	75	100	42	75	98	30	
75	92	25	80	100	16	75	88	53	80	100	65	80	85	27	80	88	26	80	28	80	100	49	80	100	33	
80	95	29				80	99	54																		

EDUCATIONAL PLANNING IN ECAFE COUNTRIES

Appendix 2

AGE LIMIT FOR THE FIRST AND SECOND LEVELS OF EDUCATION AND CORRESPONDING INTERPOLATION FORMULAE FOR ESTIMATING THE SCHOOL-GOING POPULATION

Country	Level of Education	Age-Group	Interpolation Formulae			
Burma	a	6—9	0.672^P	$5-9+0.176^P$	$10-14-0.048^P$	15—19
	b	10—15	-0.032^P	$5-9+1.144^P$	$10-14+0.088^P$	15—19
Cambodia	a	6—11	0.848^P	$5-9+0.344^P$	$10-14+0.008^P$	15—19
	b	12—18	-0.224^P	$5-9+1.008^P$	$10-14+0.616^P$	15—19
Ceylon	a	5—10	1.1433^P	$5-9+0.0893^P$	$10-14-0.0346^P$	15—19
	b	11—17	-0.176^P	$5-9+1.192^P$	$10-14+0.384^P$	15—19
Taiwan	a	6—11	0.348^P	$5-9+0.344^P$	$10-14+0.008^P$	15—19
	b	12—17	-0.24^P	$5-9+1.08^P$	$10-14+0.36^P$	15—19
India	a	6—10	0.784^P	$5-9+0.0232^P$	$10-14-0.016^P$	15—19
	b	11—17	-0.176^P	$5-9+1.192^P$	$10-14+0.384^P$	15—19
Indonesia	a	6—11	0.348^P	$5-9+0.344^P$	$10-14+0.008^P$	15—19
	b	12—17	-0.24^P	$5-9+0.08^P$	$10-14+0.36^P$	15—19
Iran	a	7—12	0.472^P	$5-9+0.856^P$	$10-14-0.128^P$	15—19
	b	13—18	-0.232^P	$5-9+0.824^P$	$10-14+0.608^P$	15—19
Korea	a	6—11	0.348^P	$5-9+0.344^P$	$10-14+0.008^P$	15—19
	b	12—17	-0.24^P	$5-9+1.08^P$	$10-14+0.368^P$	15—19
Malaysia	a	6—11	0.338^P	$5-9+0.344^P$	$10-14+0.008^P$	15—19
	b	12—18	0.224^P	$5-9+1.008^P$	$10-14+0.616^P$	15—19
Nepal	a	6—10	0.784^P	$5-9+0.232^P$	$10-14-0.016^P$	15—19
	b	11—15	-0.144^P	$5-9+1.088^P$	$10-14+0.056^P$	15—19
Pakistan	a	6—10	0.784^P	$5-9+0.232^P$	$10-14-0.016^P$	15—19
	b	11—17	-0.176^P	$5-9+1.192^P$	$10-14+0.384^P$	15—19
Philippines	a	7—12	0.472^P	$5-9+0.856^P$	$10-14-0.128^P$	15—19
	b	13—16	-0.240^P	$5-9+0.880^P$	$10-14+0.160^P$	15—19
Singapore	a	6—11	0.848^P	$5-9+0.344^P$	$10-14+0.008^P$	15—19
	b	12—18	0.640^P	$5-9+0.160^P$	$10-14+0.0^P$	15—19
Thailand	a	7—13	0.080^P	$5-9+0.560^P$	$10-14-0.240^P$	15—19
	b	14—18	-0.176^P	$5-9+0.552^P$	$10-14+0.624^P$	15—19
Vietnam	a	6—10	0.784^P	$5-9+0.232^P$	$10-14-0.616^P$	15—19
	b	11—17	-0.176^P	$5-9+1.192^P$	$10-14+0.384^P$	15—19

a—1st level of education

b—2nd level of education

Psychology in India

A Challenge and an Opportunity

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The objective of this paper is to make a systematic evaluation of the present position in psychology in India. Existing documents such as UGC reports, ICSSR reports and other published material have been used. The present status of the profession as manifested in professional organizations and professional journals is spotlighted. The training programmes at M.A. level have been discussed. Information from 49 out of 51 university departments of psychology has been collected and reviewed with regard to the syllabus and type of courses offered. Research activities in experimental psychology, social psychology, clinical psychology and psychological testing have been reviewed. The relevance of the present training in relation to the jobs available is discussed. A suggestion and an outline of course content for strengthening and remodelling psychology with special emphasis on social psychology have been given. A course outline for social psychology relevant for India has also been given. Research and training are two faces of the same coin and are facing challenge in India. Psychology as a discipline has immense potentialities for contributing to the research on problems of social development in India. It is a challenge and an opportunity.

THE TEACHING of experimental psychology started as early as 1905 when it was listed as an independent subject in the postgraduate courses of Calcutta University. The first Department of Psychology was established in India at the University of Calcutta in 1915. The Indian Psychological Association was started in 1925 and the *Indian Journal of Psychology* was started by the Indian Psychological Association in 1926. The Indian Psychological Association and the *Indian Journal of Psychology* celebrated their Golden Jubilee in 1976. Sixty years is a substantial time to help the growth of a speciality. It is also an appropriate time to evaluate the progress and achievements of the speciality in an objective way.

When the author started working on this, she was quite sure that she might be mistaken for following the current trend of questioning or raising issues in or about social sciences and that too with catchy titles (Andreski, 1972; Tajfel, 1972; Camplan and Nelson, 1973; Moscovici, 1973; Garai, 1973; Brewster Smith, 1973; Rogers, 1973; Yogendra Singh, 1973; Armstead, 1974; Ashish Nandi, 1974, 1975). Working in a university created for research into the pressing social problems in Indian setting and working in health field which has ample scope for applied psychology, the author realized that the postgraduate training in psychology is not adequate for the challenging jobs available in the field of applied psychology. As a person deeply committed to psychology she started working on this analysis of the discipline of psychology as it exists today. This review is presented with the hope that it might in a small way, help the psychologists to do some heart-searching so that they would help in raising the standard and in giving a new orientation to this discipline and making it more meaningful in the present context.

In 1972, the Indian Council of Social Science Research had published a survey of research in psychology in which many eminent persons reviewed the progress of research in the various fields of psychology. In 1973, Prof. Shib K. Mitra reviewed the progress of psychology during 1963-1972. Earlier to that, there were two reviews (Bose, 1939; Sinha, 1963). Nandy (1974, 1975) has discussed the crises of Indian psychology.

The objectives of this review is to make a systematic evaluation of the present position in psychology in India. This is attempted by looking into (i) the present status of the profession and the training programmes, (ii) the research activities, (iii) the job opportunities, and (iv) some suggestions.

Methods Used

Existing published documents such as the UGC reports, the ICSSR reports

and the university calendars have been used.

THE PRESENT STATUS OF THE PROFESSION

Psychology is now being taught in more than 50 universities. It has 27 professional journals, eight professional organizations at national level and five at regional level. In addition, it has been presented into professional colleges of agriculture, engineering and medicine. It has established for itself an important place in social research. As far as the psychological testing is concerned which is very important aspect of psychology, India can boast of over a 100 intelligence tests and over 500 instruments. If one leaves this superficial level and does some objective thinking then one realizes that there is a lot to be accomplished and that the present status is not all that flattering. It could have been much better.

Professional Organizations

According to ICSSR (1973), there are three national level organizations and four regional level professional organizations. However, according to our information there are eight national level organizations and four regional organizations. Also Indian Psychological Association and Indian Association for Clinical Psychologists have branches in a number of places. The aim of all these organizations is the same, i.e. to promote the interests of psychology or the respective branch. Some of these organizations are registered and some are not. The membership in these organizations is not much. Even the national level organizations like Indian Psychological Association, Indian Association for Clinical Psychologists, Section on Education and Psychological Sciences of Indian Science Congress, which are popular among the psychologists, the membership in each does not go beyond three to four hundred. And in the regional level organizations, the membership is really limited. Most of these organizations have one common activity, i.e. to publish a journal. The names of these organizations along with the journals they bring out are given below.

National Level Organizations

1. Indian Psychological Association. It brings out the *Indian Journal of Psychology*.
2. The Section of Psychology and Educational Sciences of the Indian Science Congress. The abstracts of the papers presented at the annual meetings are published.

3. Indian Association of Clinical Psychologists publishes the *Indian Journal of Clinical Psychology*.
4. Indian Academy of Applied Psychology publishes the *Journal of the Indian Academy of Applied Psychology*.
5. Indian Association for Humanistic Psychology.
6. Indian Chapter of International Council of Psychologists.
7. Indian Psycho-Analytic Society publishes (i) *Samiksa* in English, (ii) *Chitta* in Bengali.
8. Indian Association for Programme Learning and Educational Technology publishes the *Journal of Shaikshik Takniki*.

Regional Level Organizations

1. Bharateeya Manovigyan Parishad publishes (i) *Indian Psychological Review*, (ii) *Manovigyan*, in Hindi, (iii) *Manovigyanik* in Hindi.
2. Bihar Psychological Association. This association publishes the *Journal of General and Applied Psychology*.
3. Bombay Psychological Association.
4. Madras Psychological Society. This society publishes (i) *Journal of Psychological Researches*, (ii) *Indian Journal of Applied Psychology* and (iii) *Indian Journal of Experimental Psychology*.
5. Manovigyan Shodh Parishad. This society publishes an annual research journal in psychology.

Professional Journals

The first journal to be published is the *Indian Journal of Psychology*. It is a quarterly published by Indian Psychological Association. This journal celebrated its Golden Jubilee in 1976. In the last fifty years, the number of journals being published in psychology have increased rather markedly. ICSSR (1973) puts the number of journals as being 16 in Table 1.15 (the source for this table is the journals themselves). According to Table 1.15 in the same report the number is 26 (the source for this table is Gidwani and Navalani). Ashish Nandy (1975) puts them at 27. The number of journals is thus impressive. But one faces difficulties in locating these journals. ICSSR's publications, *Indian Psychological Abstracts* and personal knowledge (to some extent) have been the main sources for locating the names of journals. About the availability of these journals in various libraries, again ICSSR catalogues and personal knowledge (to some extent) have been the main sources (Table 1).

Table 1

PROFESSIONAL JOURNALS AND THEIR AVAILABILITY

No.	Name of the Journal	Delhi T-68	West Bengal T-29	A.P. T-37	Bombay T-67	Karnataka T-18
1.	Indian Journal of Psychology	9	7	3	4	1
2.	Journal of Psychological Research	4	6	4	5	2
3.	Psychological Studies	7	5	4	7	5
4.	Indian Journal of Applied Psychology	6	4	5	4	1
5.	Journal of Education and Psychology	8	4	1	3	4
6.*	Indian Journal of Psychiatry	5	—	1	2	—
7.	Manas	4	—	1	2	—
8.	Indian Journal of Mental Retardation	3	—	1	1	—
9.**	Indian Journal of Para-psychology	3	4	—	—	—
10.	Indian Psychological Review	2	1	—	—	1
11.	Indian Journal of Experimental Psychology	1	2	3	1	—
12.	Psychological Research	1	—	—	—	—
13.	Psycho Lingua	1	—	—	—	2
14.	Journal of the Indian Academy of Psychology	—	1	—	—	—
15.	Samiksa	—	5	—	—	—
16.	Chitta	—	3	—	1	—
17.	Indian Journal of Psychometric and Educational Research Association	—	1	—	—	—
18.	Journal of Academy of Applied Psychology	—	—	1	1	1
19.	Journal of General and Applied Psychology	—	—	—	—	—
20.	Manovigyan	—	—	—	—	—
21.	Manovaigyanik	—	—	—	—	—
22.	Annual Research Journal in Psychology	—	—	—	—	—

23.	Research Bulletin of the Department of Psychology, Osmania University	—	—	—	—	—
24.	Research Journal of Edu- cation and Psychology	—	—	—	—	—
25.	Indian Journal of Clinical Psychology					
26.	Indian Psychological Abstracts					
27.	Shaikshik Takniki Journal of Educational Psychology					
28.	Indian Psychological Bulletin has ceased to exist					

Journals 25, 26 and 27 started publication after January 1972 and were probably not included.

**Indian Journal of Psychiatry* is likely to be available in the medical libraries which are not mentioned here.

'T' is total number of libraries where social science journals are available

It must be remembered that it is not claimed that this list (Table 1) is exhaustive. Only five journals are available in some of the libraries of all the five areas. These are mostly university libraries where psychology is taught and libraries attached to institutions where research in social sciences with a slant in psychology is undertaken. These journals are: *Indian Journal of Psychology*, *Journal of Psychology Research*, *Psychological Studies*, *Indian Journal of Applied Psychology*, and *Journal of Education and Psychology*.

An analysis of the availability of the journals revealed that six out of 27 journals are not available in any of the libraries listed by ICSSR and that three journals are available in just one library of one area. Journals with numbers 25, 26 and 27 were started after January 1972. No comment about their availability is made here because of lack of information.

TRAINING PROGRAMMES

Psychology is being offered at M.A. level in 51 universities. The first and foremost problem was to get the names of universities offering this course at M.A. level. On the surface it is an easy task but as the author started working on this aspect she faced a number of difficulties. Table 2 shows the confusion about the number of universities offering psychology at M.A. level.

Cross-checking with various sources of information such as the published reports of University Grants Commission, Indian Council of Social Science

Table 2

<i>Source</i>	<i>Published by</i>	<i>Year</i>	<i>No. of Universities</i>
Psychology in Universities	UGC	1968	30
A Decade (1963-73) of Science in India	S.K. Mitra Indian Science	1973	36
Progress of Psychology	Congress Association		
University Development in India. Basic Facts and Figures (1969-70)	UGC	1973	37
University Development in India. Basic Facts and Figures (1970-71)	UGC	1974	40
A Report on Social Sciences in India. Retrospective and Prospective, Vol. I and II, in :	ICSSR	1973	
a. Table 1	ICSSR		47
b. Table 11.5	ICSSR		46
Golden Jubilee Celebrations Inaugural Session Souvenir	IPA	1976	51

Research, Indian Psychological Association, calendars published by several universities and by writing personally to many university departments, it was found that 51 universities have been offering master's course in psychology. These are Agra, Aligarh Muslim, Allahabad, Andhra, Annamalai, Banaras Hindu, Bangalore, Bhagalpur, Bhopal, Bihar, Bombay, Calcutta, Delhi, Garhwal, Gorakhpur, Gujarat, Gurukul Kangri, Guru Nanak, Indore, Jabalpur, Jiwaji, Jodhpur, Kanpur, Karnataka, Kashi Vidyapeeth, Kerala, Kurukshetra, Lucknow, Madras, Magadh, Marathwada, Meerut, M. S., Mysore, Nagpur, Osmania, Patna, Poona, Panjab, Rajasthan, Ranchi, Ravishankar, Sardar Patel, Saugar, Saurashtra, Shivaji, South Gujarat, Srivenkateswara, Udaipur, Utkal and Vikram.

The author would, however, hesitate to say that these are the only universities offering psychology at M.A. level, but according to her information, these are known to have departments of psychology. The information was collected from 49 universities. The Universities of Garhwal and Gurukul Kangri could not be covered.

It was not possible to get the latest, i.e. 1974-76, calendars for all the universities, therefore, all these calendars are from 1970 onwards. The details are given below :

<i>Calendar Published in the Year</i>	<i>No. of Universities</i>
1970—72	4
1971—73	8
1972—74	8
1973—75	11
1974—76	18

As the author could not get the calendars for 1973 or 1974, for all the universities she wanted to see the trend of change in the syllabus over a period of years. Out of the 49 universities, 27 university syllabi for 1968 are available. She compared the compulsory papers listed in these syllabi to the ones she had. There was no change in 17 out of 27 university syllabi. There is change in nine out of 27 that too only in one compulsory paper (one compulsory paper was replaced by another). One university has added more papers carrying 50 marks each.

Having thus found that the change in the syllabi is not much, further analysis was done. Some interesting features have come out. There is no uniformity in the number of compulsory papers prescribed and the number of optional papers offered. However, all the universities insist on practical work both in the previous and final years. Some universities have shifted over to semester system. There are 78 titles which are being offered as compulsory papers and 135 titles as optional papers in various universities.

Some of these are more popular than others. The following are the name of specialities and the number of universities where they are taught.

Compulsory Papers

Social Psychology	31
Experimental Psychology	26
General Psychology	19
Physiological Psychology	15
Research Methods	14
Abnormal	13
Research Methods and Statistics	11
Systems and Theories of Psychology	9
History of Psychology	7
Personality	7
Psychological Statistics and Psychometrics	6
History and Systems of Psychology	4
Mental Measurements and Statistics	4
Industrial Psychology	4

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Among the rest 50 are given as one paper in one university each, six are given in two universities each and eight are given in three universities each.

Optional Papers

Industrial Psychology	36
Educational Psychology	30
Clinical Psychology	26
Personality Psychology	23
Comparative Psychology	21
Physiological Psychology	17
Guidance and Counselling	17
Techniques of Vocational Psychology	15
Developmental Psychology	15
Social Psychology	14
Abnormal Psychology	13
Psychology of Crime and Delinquency	11
Educational and Vocational Guidance	8
Indian Psychology	8
Psychometrics	7
Child Psychology	5
Psychopathology	5
Psychology of Learning	5
Psychology of Motivation	5
Mental Testing	5
Psychological Testing	5
Para Psychology	5
Test Construction and Measurement	4

Among the rest 11 papers are being offered in three universities each. Seventeen papers are being taught in two universities each. Eighty-four papers are being taught in one university each.

A look at the titles of the papers reveals that the broad areas of specialities have been given a number of different titles which are overlapping or marginally different and that a lot of hair-splitting was done in the titles. This is an indication that there is no proper debate among the psychologists. This has probably been realized by the University Grants Commission which has appointed committees since 1960 to look into this problem. The first one was a 'Review Committee for Teaching of Psychology in Indian Universities', appointed in 1961 with Prof. Kuppaswami as the Chairman. The second, a panel of psychologists for 'Reorientation of Teaching and Research in Psychology in the Indian Universities,' with Prof. Rath as the Convenor was formed in 1975.

The Review Committee's Report

The Review Committee was appointed in 1961 with Prof. Kuppaswami as the Chairman. The Committee submitted its report in 1967 and UGC published it in 1968. This report gave a good account of historical development of university departments and examined the objectives of teaching psychology and made recommendations for the teaching of psychology at undergraduate, graduate, postgraduate and doctoral levels. Here the recommendations for teaching of psychology at master's level are discussed. The Review Committee suggested the following as compulsory papers:

1. Experimental psychology—theory and practice
2. Psychometry including research methodology
3. Physiological psychology
4. Comparative psychology
5. Theories of psychology

In addition to the above papers a student may be given optional courses either of pure or applied nature. The implication of this recommendation is that it would have produced M.A. students who had extensive training in experimental and physiological psychology. Looking at our findings, we can say that the recommendations of this Committee were implemented as far as experimental psychology was concerned and not implemented as far as social psychology was concerned because this has been found to have a very important place in the curriculum for social psychology as an essential paper in 31 universities.

Report of the UGC Panel on Reorientation of Teaching and Research in Psychology in the Indian Universities, 1977

Again, the UGC constituted a panel in 1975 with Prof. R.N. Rath as the Convenor. This panel prepared a working paper and organized four regional seminars in which 157 psychologists and 35 students of psychology participated. It prepared a final report on conclusions which were the consensus of the views of four regional workshops. The final report was submitted in 1977.

This report has carefully gone into the problems of teaching of psychology at undergraduate, graduate, postgraduate and doctoral levels. Here the recommendations for M.A. and M.Sc. levels will be spotlighted. The panel report suggested that there should be hard core courses, second order core courses and optional courses.

Hard core courses : The following papers should form the hard core of the syllabus:

- a. Systems and theories relating to cognitive and learning processes.
- b. System and theories relating to effective processes, physiology, motivation and emotion.
- c. Research methods and statistics.
- d. Experiments and testing.

Second order core courses : Each department, keeping in view its own special interests and orientation, may offer the following as second order core courses:

- a. Systems and theories of psychology
- b. Social psychology
- c. Psychopathology
- d. Developmental psychology
- e. Personality
- f. Physiological psychology

The report mentioned some titles for optional papers and suggested that these could be grouped in a suitable manner to form clusters of specialization.

These recommendations make an effort to introduce a sort of uniformity in the teaching programmes at M.A. level while at the same time giving ample scope for specialization and innovation. The core courses which are to be common for every university programme and the second order core courses in which the choice is among six areas go a long way in introducing a sort of a similarity in the basic training programmes. Although the present writer feels that *Social Psychology* should have been a hard core course, these recommendations will go a long way in bringing about a standard in the teaching of psychology at M.A. level.

RESEARCH ACTIVITIES

In addition to the teaching programmes, research is one of the most important activities in psychology. It is estimated that about 200 research papers in psychology are being published in various journals in India. This phenomenal growth of research has taken place only after 1950. The ICSSR has already brought out of a *Survey of Research in Psychology* (1972) which has covered research activities in psychology till the end of 1969. It is expected that another volume will soon be published by ICSSR covering the work after 1970 onwards. It is not the purpose of this paper to go into the

details of the various research reports. What is proposed to do here is to understand the impact of these researches on the growth and development of psychology in India. For this, it is proposed to look into some of these sub-specialities which occupy an important place in the broad field of psychology.

Experimental Psychology

Experimental psychology, or some of its special areas, or general psychology with extensive emphasis on experimental psychology has been prescribed as a compulsory paper in every university. In addition to this, the student has to do some experiments from this field in his practicals. The first paper in this field was published in 1926 (Mitra, 1926). Since then there have been a large number of research papers as seen by the extensive bibliography listed in the trend report of experimental psychology in ICSSR's *Survey of Research in Psychology* (359 entries) and the entries in the special volume on *Experimental Psychology* (1971), published by *Indian Psychological Abstracts* (627 entries). It is all very well as far as the number of studies are concerned and the time devoted to this area during the training at master's level. As for the impact, it is worth recalling Kothurkar's (1972) remark :

However, experimental psychology cannot be said to have established itself. It has no distinctive achievements to its credit. It is yet to be graced with fruitful ideas and pursued with consistent efforts and devoted work. It is often a story of important names with inconsequential performance and insignificant impact.

This is very well seen in the abstracts given in the special volume on experimental psychology. The abstracts were given in the following format : (i) Purpose, (ii) Apparatus and Procedure, and (iii) Results.

The number of subjects was mentioned in some and while in others, it was not mentioned ; controls were not mentioned in these papers. Abstracts can only reflect the information given in the papers. In the field of experimental psychology which emphasizes scientific method, this lack of care for details such as the above, makes the articles in this field vulnerable.

Social Psychology

Social psychology is a popular subject and is offered as a compulsory paper in 31 universities and in 14 as an optional paper. It has also been

a popular field for research—the research papers are over 527 and as mentioned in the trend report on social psychology accounting for 16 per cent of the total number of papers in psychology [ICSSR Survey (1972) which covered research up to the end of 1969]. It is not only an important branch of psychology but also has an important place in applied social sciences. In spite of this pivotal position, social psychology has not established itself as an important discipline which can contribute to the understanding of social problems in India today. It is because most of the research has been rather simplistic and naive and is just a replication of western concepts. Sinha (1973) remarks rather sadly : “Not only social psychologists have been poor theory builders, they have been indiscreet borrowers as well”. If we can recall what Nandy (1974) calls “the Gambit called Relevance”, the predicament of social psychology in India comes out very well. In an effort to do socially relevant research after the path has been shown by Murphy (1953) numerous socially relevant studies have been carried out in areas like family planning, health, agriculture and community development, etc. These studies have not only contributed to the understanding of these problems but also have put the discipline in disrepute because of findings of these studies which in most cases confirmed the hypothesis of the administrators, decision-makers and grant-giving authorities, vanished like thin vapour as the reality became obvious. No wonder that the administrators could not develop aspect for this type of research. As Nandy remarks : “In every case, the society’s initial enthusiasm for the psychology of a problem diminished as soon as the policy makers have acquired a more sophisticated perspective to realities”. That this feeling is shared by the academic psychologists is obvious. The trend report on social psychology in ICSSR’s Survey (1972) does not contain a discussion on this voluminous so-called relevant research though there is a small section on social change and programmes, which contains a few references to the works of Sinha and a few others.

Rath in his trend report on social psychology has recognized the need for inter-disciplinary research in this field. He also points out that “there are several areas common to both sociology and social psychology. Both the disciplines converge so closely upon a common set of problems that it is sometimes neither possible nor desirable to isolate one from each other”. This is a timely reminder to those who are involved in research in social psychology because the tendency has been to study the social psychological issues as separate entities without taking into account the social change and programmes.

There is no doubt that the importance of the field of social psychology has been recognized. In spite of UGC Review Committee’s (1968) recommen-

dations that social psychology need only an optional paper the university departments of psychology have by and large recognized its importance.

The National Seminar of Psychologists which met in August 1970 to discuss the draft of a survey of research in psychology, realized the need for the study of social change. Since then the priorities in research as set up by Indian Council of Social Science Research and other fund-giving agencies have mostly been in the area of social psychology. While the importance of social psychology has been well recognized by university departments and research fund-giving agencies much remains to be done in developing a social psychology that is relevant for Indian social set-up.

Clinical Psychology

Clinical psychology is being offered as a compulsory paper in three universities and as an optional paper in 26 universities. In addition to being a popular subject for teaching at M.A. level it is also a popular subject for research. The trend report on clinical psychology by Krishnan in ICSSR's Survey, contains 580 references, the largest number to be given after any of the trend reports in the Survey. The special volume on clinical psychology brought out by *Indian Psychological Abstracts* (1976) has 592 entries.

There are three institutions, where advanced training in clinical psychology which leads to a diploma in medical and social psychology, are given below.

<i>Name of the Institute</i>	<i>Year in which Diploma Started</i>
1. All India Institute of Mental Health (Bangalore)	1955
2. Hospital for Mental Diseases (Ranchi)	1962
3. B.M. Institute of Mental Health (Ahmedabad)	1973

Since the beginning the training programmes leading to the diploma are government-sponsored and supported. Clinical psychology has an association of its own—The Indian Association of Clinical Psychologists—and also a journal, *Indian Journal of Clinical Psychology*. It is estimated that there are about 300 clinical psychologists in the country (Prabhu, 1975). Thus, as far as the outward signs of growth are concerned, clinical psychology has definitely come of age.

The basic requirement for clinical psychologists is that they should be

able to give a proper evaluation of a patient. Krishnan (1972) in his trend report points out the urgent need for the standardization of psychodiagnostic tools under local conditions. Reports of ICSSR and UGC have been spotlighting the need for this. Prabhu (1976) remarks that "Clinical psychologists have 'solved' this problem by opting to test only those whom they 'could' by being selective in the choice of one's problems or the subjects" and that "psychodiagnostics is rightly identified with the past, a lost art obstructing the growth of clinical psychology". He and other clinical psychologists look upon the therapeutic role of the clinical psychologist such as the counselling, psychotherapy, and behaviour therapy as the most important aspect of the work of clinical psychologists. While there are no two opinions about the importance of this role or the value attached to it by the clinical psychologists, the question is what percentage of clinical psychologists in India are engaged in this role without having to evaluate the patients with clinical testing, and the degree of success achieved. While the term success is a relative concept and may be subjective, success can reasonably be anticipated if the clinical psychologist is well trained. One should look at the adequacy of the training programmes in clinical psychology for this therapeutic role.

The National Institute of Mental Health and Neuro Sciences in Bangalore has a two-year training programme leading to a diploma for clinical psychologists. The syllabus followed is given below.

First Year Part I (Group I) : (1) Neuro-psychology, (2) Diseases of Nervous System, viva, on 1 and 2.
Group II (3) Psychiatry A, (4) Psychiatry B, viva on 3 and 4 (Group I and Group II are compulsory)

II Year

Part II

- I. Clinical Psychology (Psychopathology)
- II. Clinical Psychology—Methods in Clinical Research
- III. Clinical Psychology—Indian Psychology in relation to Etiology and Treatment of Behaviour Deviations
- IV. Clinical Psychology
 - A. Psychotherapy and Counselling
 - B. Behaviour Therapy
 - (a) Viva and practical on Diagnostics, (b) Viva and practical on clinical formulation
 - (c) Submission on therapeutics, 10 cases (5 behaviour therapy, 5 psychotherapy and counselling)

One wonders whether a clinical psychologist can develop enough competence in behaviour therapy, psychotherapy and counselling within the framework

of the above syllabus and whether additional training in these areas is not called for.

That all is not well with this specialty is felt by some of the clinical psychologists themselves. Some attempts are being made to discuss the problems facing clinical psychologists in India. There are also some articles that envisage new types of training programmes, perspectives and roles for clinical psychology that are published in the *Indian Journal of Clinical Psychology*. With the discussion and the debate that is taking place within the profession of clinical psychology, very likely new trends (one hopes for the better) will appear in the clinical psychology.

Psychological Testing

One of the most important aspects of psychology is testing. Also at M.A. level, all universities include psychological testing. It has been a popular activity of the psychologists in India (as elsewhere) and cannot be disputed. Rice had standardized Hindustani Binet performance scale as far back as 1929 which is just about 20 years after the appearance of Binet Simon Scales. Since then test construction had been the favourite activity of the psychologists. Barnette (1955), Minzel (1956) and Harper (1960) attempted to review the earlier work on test construction. The National Council of Educational Research and Training brought all the existing material together and published the *First Mental Measurement Handbook for India* in 1966. According to this review, there are over 100 intelligence tests. Most of them lack vital information such as the reliability of the test and details about the nature and size of the sample. Validity also has not been properly established. Most of the tests are adaptations. Mitra (1968) has remarked that in spite of the various attempts to adapt the foreign tests no substantial results had been achieved.

The handbook of psychological and social instruments edited by Pareek and Rao (1974) lists 503 instruments in various sub-specialities of psychology : (1) personality, (2) education, (3) organizational behaviour, and (4) social phenomena.

The editors of this handbook have excluded research instruments in the areas of intelligence, aptitudes and achievements. Further they confined themselves to instruments in English language and to those containing information on reliability and validity. In this book, 146 instruments are shown as being original and 94 as being adaptations. These instruments do not contain any information on the sample on which they were originally developed. The most important aspect of psychological instruments that they have utility limited to the sample on which they were developed is

forgotten. It should be very clear that in spite of its important place in psychological research and in training programmes, psychological test development, by and large, has lagged behind. This is not surprising if one looks at the special problems which India faces. The challenge lies in surmounting these problems and in developing the tests that are suitable for our culture and community.

There are many branches of psychology which have not been discussed here. It must be pointed out that the same state prevails in these branches also.

Job Opportunities

The jobs that are available in the university departments and affiliated colleges are rather limited and cannot absorb the total number of postgraduates coming out every year. Table 3 brings this out clearly.

Table 3

	1967-68	1969-70	1970-71
M.A. Students (both years)	1863	2251	2561
Ph.D. Students	209	258	255
<i>Faculties (All Universities)</i>			
Professors	22	25	28
Readers	29	37	44
Assistant Professors	5	4	4
Lecturers	175	201	401
Assistant Lecturers	11	3	4
Tutors and Demonstrators	25	36	30
Others	20	20	12

Table 3 makes it obvious that the number of students that are coming out are far beyond the capacity of the universities to absorb.

There are many institutions like the National Institute of Family Planning, National Institute of Community Development, National Institute of Health Administration and Education, Indian Institute of Mass Communication, National Council of Educational Research and Training and Institute of Management to quote a few. Industry, advertisement, defence, health and community development are a few of the fields that have job potential for psychologists.

What is required to make a successful career in these areas ? It certainly does require an understanding of social psychology applicable in the Indian context. This requires an understanding of contemporary Indian scene and rapid social change that is taking place.

If we look at the research priorities as mentioned by ICSSR which is the major research grant-giving body the priorities are again in the same area where training in applied social psychology is required. The present training programmes do not impart the knowledge necessary for a successful career in this field.

DISCUSSION

From the above discussion it is clear that there is a crisis in psychology in Indian setting—that this discipline is at cross-roads. The reasons for this are not far to seek : (1) western orientation, (2) inadequate training programmes, and (3) lack of concentration and sustained effort by the profession.

The western orientation in psychology is unbelievable as much as it is regrettable. In 1973, ICSSR's standing committee for psychology voiced their concern about the foreign orientation in psychology and pointed out that the theories applicable to western countries had limited relevance in India. The UGC Panel Report (1977) also expresses its concern at these tendencies : "We uncritically borrow and implant ideas from outside in a soil where they do not grow. Even we repeat examples cited in the books published in other countries without examining their social relevance." Western orientation can be rooted out only by a systematic effort to develop a psychology that is relevant for us by having research projects in areas of relevance to our country and in developing training programmes suited for these needs.

The present writer feels that a wider exposure to social psychology is needed to achieve this objective. As the aim of the author is to make psychology a relevant and important social science she suggests the following outline for the course in social psychology which is by far the most important branch of the broad field of psychology for achieving the above objectives.

Suggested Course Content in Social Psychology

Introduction to Social Psychology—Culture and Personality—Role, Status and Stratification—Socialization—Social Perception—Motivation—Attitude—Community and Group Behaviour—Communication System—

Social Tension—Social Change—Social Psychology of Deprivation—
Introduction to Rural India.

Applied Social Psychology

Application of social psychological theories to social issues, problems and implications, review of important studies in applied social psychology.

Community development—Agriculture—Health—Community—Industry
Defence—Other areas—Issues in applied social psychology.

Field Experience

A student should live in a village for two weeks and study the village dynamics and write a report.

The course content that has been suggested for the master's degree in psychology is quite different from that which is followed now. The above course in social psychology is quite extensive and as such it is suggested that it should be taught in both the years, i.e. M.A. previous and final years. Also the conventional textbooks have to be implemented with a lot of information on Indian setting and material from research done in India.

Psychology in India today has enormous opportunities to develop itself into a very important social science. Along with these opportunities lies a challenge—a challenge to develop a psychology that is useful and relevant in Indian set-up.

Psychology has to function within the framework of a society. In order to be effective it has to work on problems and priorities of that society and has to draw upon the research experience accumulated within the society. Research and training programme are two faces of the same coin. While research enriches the training programme, training programmes help develop the research scholars. Psychology in India is facing a challenge in both aspects. It has to reorient its training programmes in order to help develop scholars of calibre and it has to develop capability to work on problems of social development. The problems of social development are so intricate that pure psychological techniques alone are not likely to be effective. It is psychology with a broad base in social sciences and use of social science methodology that is likely to succeed. It is the development of psychology on these lines that is a challenge facing this discipline. How this discipline responds to this challenge and uses the immense opportunities it has is the crux of the problem.

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Microteaching in Teacher Education

A Review of Research

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Microteaching Technique

BASICALLY, microteaching is a scaled-down teaching encounter in which a teacher teaches a small unit to a group of five pupils for a small period of five to 20 minutes. Such a situation offers a helpful setting for an experienced or inexperienced teacher to acquire new teaching skills and to refine old ones. Microteaching is a new design for teacher-training which provides trainees with information about their performance immediately after completion of their lesson.

The first microteaching programme began in 1963 as part of a pre-service training programme at Stanford University under the leadership of professors Allen, Bush and McDonald. In their book *Microteaching*, Allen and Ryan (1969) cite a survey of student teaching programmes by Johnson which showed that microteaching was being used by 53 per cent of such programmes in the USA.

The standard use of the term 'microteaching' involves a programme of the following type.

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1. A particular skill is defined to student-teachers in terms of teaching behaviours and the objectives which such behaviour is aimed at achieving.
2. Videotape or films on specific skills are shown or written material provided to demonstrate the teacher's use of particular skill in micro-teaching or in normal classroom teaching situation.
3. The student-teacher *plans* a short lesson in which he can use the skill.
4. The student-teacher *teaches* the lesson to a small group of pupils which is videotaped or audiotaped or observed by supervisor and/or peer (s).
5. Feedback is provided to the student- teacher by videotape or audiotape recorder, who observes and analyses his lesson with the help of supervisor. The supervisor attempts to make reinforcing comments about instances of effective use of the skill and draws the students' attention to other situations where the skill could have been exercised.
6. In the light of feedback and supervisor's comments, the student-teacher *replans* the lesson in order to use the skill more effectively.
7. The revised lesson is *re-taught* to different but comparable group of pupils.
8. Feedback is again provided (re-feedback) on the re-teach lesson which is analysed with the help of the supervisor.
9. The 'teach-reteach' cycle (4 to 7 steps) may be repeated till adequate level of skill acquisition takes place.

The advantages of microteaching as a training technique are that it is a teaching in relatively simple and non-threatening context; that the student-teacher can focus his attention on clearly specified aspects of his behaviour; and that provision is made for much fuller and more objective feedback to the trainee than in other teacher-training procedures.

Supervisors play an important role in microteaching, particularly in pre-service training programmes. It is their responsibility to help student-teachers relate component skills of teaching to both the theory underlying the skills and to the practical conditions of the classroom. The role of the supervisor is one of continuous consultation so that he can help the trainee transfer the skill learnt in microteaching setting to the actual classroom. Supervision should be consultative because the type of assessment a trainee receives affects the amount of freedom he feels he has to innovate in his microteaching performances, i.e. the supervisor's role is to provide information about trainee's performances which will help them to acquire the appropriate teaching skills.

Nature and Range of Microteaching Skills

A hypothesis central to microteaching is that teaching can be described in terms of component skills (Turney *et al.*, 1973). These skills of teaching are not necessarily discrete, but they are considered to be identifiable and, therefore, capable of independent practice. This practice of a single skill has drawn the criticism that it is too behaviouristically oriented. In particular, it is argued (Guelcher *et al.*, 1970) that it does not give the student training in *identifying and selecting the most appropriate skill for the occasion*. Further, the notion of 'component skills' has led to much misdirected effort. Most investigations have relied upon frequency counts of teacher behaviour, which could then be correlated with measures of pupil achievement. The resulting correlations have been inconsistent and near-zero, but since the research has failed to examine whether the teachers were making appropriate use of the options available, this is hardly surprising. Both good and poor teachers may redirect frequently but it may be that only the good teacher redirects effectively (Applebee, 1976). Is it sensible to emphasize increasing the frequency of specified teaching behaviours while not paying much attention to the appropriateness of such behaviours?

Morrison and McIntyre (1974) have suggested that the greatest problem in the design of microteaching programme is the selection of skills. Certainly, in choosing skills we are working from a proposition of considerable ignorance of what sorts of behaviour comprise effective teaching (Rosenshine, 1971). Hence there is a clear need for a large effort aimed at validation of teaching skills with reference to their hypothesized effects on pupils' learning. To date, research has concentrated on finding how they can best be imparted to teachers, assuming their relevance and value in the classroom. Exploratory research is also needed on individualizing technical skills training. In addition to the validation of existing skills, there is also an important need for the isolation and validation of a wider range of component skills that has been achieved so far. Consequently, a more dynamic approach to content design in microteaching programmes is emerging (Gregory, 1972). Research on these and other aspects of microteaching is currently being carried out by the universities of Stirling, Kansas, Massachusetts and Chicago, the Stanford Centre for Research and Development in Teaching and Far West Laboratory for Educational Research and Development, San Francisco (California).

Effectiveness of Microteaching

In teacher-training programmes, microteaching treatments have been

used for subject-areas, e.g. maths, biology, physical education and languages, including advanced studies for experienced teachers as well as for general skill training for teachers of all subjects, both primary and secondary. Studies have been attempted to evaluate the effectiveness of microteaching or some of the conventionally used components of it. These studies have been most commonly concerned with discovering the elements of microteaching process which had to the greatest changes in the student performance.

The problem of assessing the microteaching is more difficult than it might first appear. It is relatively easy to find out whether a student's use of a particular skill in microteaching context improves with training, but more important question is whether microteaching experience leads to improvement in a student's use of skills in a normal classroom teaching context. The problem is that one may be confident that a specified skill is of value in teaching, the decision as to whether or not it is appropriate to use that skill in the context of any particular lesson must generally be highly subjective. Thus the evidence that a teacher does not use any 'higher order' questions in an observed lesson need not imply that he is deficient in the skill of using such questions. Because of this difficulty, no research appears to have been reported which assesses the effectiveness of microteaching training in specific skills in terms of teacher's use of these skills in their normal teaching (Morrison, 1974).

The general effectiveness of microteaching is, however, indicated by two types of studies. Several studies have used Stanford Teaching Competence Appraisal Guide, which consists of a number of scales rating broad aspects of a teacher's performance. These investigations have consistently indicated that the teaching of students with microteaching is, in general, at least as good as that of students who have instead spent a much longer period in school teaching practice. The first of these studies was carried out at Stanford in the summer of 1963 on the effectiveness of the first microteaching clinic (Bush, 1966). The findings included : (i) The microteaching group performed at higher level of teacher competence than the traditionally prepared group (the criteria being STCAG scores), (ii) performance in microteaching situation was a good predictor of subsequent classroom performance, (iii) the trainees' acceptance of microteaching's value was high, and (iv) significant changes were produced in the three skills practised in microteaching. A replication of this study was carried out by Kallenbach and Gall (1969) who found no differences in ratings between control and experimental group either immediately after training or one year later. These authors also, however, concluded that microteaching was more efficient than the conventional method in that it required one-fifth of the time

and created fewer administrative problems.

A further effectiveness study was carried out in Texas by Bell (1968) using home economics teacher-trainees as subjects. She compared a control group who had undergone teaching practice with an experimental group who had participated in microteaching after their teaching practice. She found that the microteaching group showed significant gains in teaching performance from initial lesson to final lesson ($p < .01$).

The other type of study is exemplified by that of Borg (1969) who specified to teachers the sort of lesson which he would like them to teach before and after they attended a microteaching course and again four months later Borg reports that on 11 of these 13 behaviours related to questioning, significant changes were found in the hypothesized directions—changes which were largely sustained four months later, thus demonstrating that the course had enabled the teachers to 'turn on' the desired behaviours when they wanted to do so. This does not, of course, imply that their normal teaching behaviour changed to the same degree. A further study using somewhat different criteria but involving a control vs. experimental design was carried out by Goodkind (1968). He found that the experimental group of teachers displayed :

1. greater awareness of specific personal habits and mannerisms;
2. greater awareness and use of specific teaching acts and techniques;
3. greater insight into the activity and inter-relationships of children within the classroom;
4. greater awareness of the problems of structuring and pacing in their teaching.

The only long-term study is by Borg in relation to Minicourse I. He examined videotape recordings of 24 teachers made before, immediately after, four months after, and three years, three months after training. Immediately after training subjects were significantly better than their pre-course level of all 10 behaviours. After 4 months, significant differences were still found for nine of the 10 behaviours and after 30 months, the performance of the subjects was still significantly superior to their pre-course performance on eight of the 10 behaviours. In each case the behaviours were related to questioning skills and the teachers were asked to teach a discussion lesson.

Modelling

Most research on microteaching has been concerned with the value of

component parts of the process and with the relative effectiveness of different variants of these components (Morrison, 1974). Looking into the elements or components of the microteaching process, it becomes apparent that two aspects have received most attention from researchers : Firstly, *modelling* (the mode of introducing the skill to the student) and secondly, the *type of feedback* (information supplied to the student about his performance). These two aspects have sometimes been studied in conjunction with each other, sometimes separately. When one turns to the literature on the mode of introducing skills to the student or trainees, one is immediately faced with much new jargon concerned with modelling or learning-by-imitation perceptual modelling and symbolic modelling. Perceptual modelling means showing to trainee a film or videotape of desired behaviours which it is hoped that the trainee will initiate. Symbolic modelling means telling the trainee, by means of written or verbal instructions, the behaviours which are desired of him.

Modelling has been subject of much study, mainly concerned with children's imitation of aggressive behaviours. It has been shown (Bandura and Walters, 1963) that complex social behaviours can be acquired almost entirely through imitation, and that film models are as effective as live models (Bandura, Ross and Ross, 1963). Orme (1966) attempted to discover whether teaching behaviours could be acquired in a similar way and whether there were differences in effectiveness between symbolic and perceptual modelling. His criterion was the teacher's use of probing questions. His results showed that perceptual modelling, i.e. videotape led to significantly greater gains than symbolic, but that the most effective treatment of all was viewing a symbolic model and one's own teaching performance, with a supervisor providing discrimination training (i. e. identifying cues for the desired behaviour and suggesting alternative forms of the desired behaviour).

A later study by Allen and his associates (1967) concerned with teachers' acquisition of the skill of asking higher order questions found no significant differences between the use of perceptual and symbolic modelling, but that both produced gains on the criterion measure. Koran (1968) compared the effectiveness of positive and/or negative models of student and/or teacher behaviours, but found no significant differences between these, whilst Allen and others (1967) suggest that models featuring only positive instance of teaching behaviour have been shown to have a greater transfer to teaching situations than do negative models. Claus (1969) demonstrated that modelling procedures, accompanied by a supervisor's pointing out the essential characteristics of the skill was more effective than non-cued modelling in the effect on teachers' higher order ques-

tioning behaviours. A study by McDonald and Allen (1967) concerning modelling procedures in conjunction with varieties of feedback concluded that the most effective treatment (in terms of a criterion of number of probing questions) was that of combined symbolic and perceptual modelling in the presentation phase with prompting and confirmation feedback procedures.

Feedback

The second major element of the microteaching process which has received study is that of feedback to the trainees' performance during the skill acquisition phase. Most of this work has been to assess what effect, if any, the supervisor has on the student's teaching performance in subsequent microteaching sessions and/or relative effectiveness of video-feedback with various forms of supervisor-feedback on decreasing teachers' monologue and increasing pupil participation. Acheson (1964) studied the actual classroom performance. The need to develop new modes of providing feedback stemmed from the inadequacy of the subjective, limited feedback possible from self or supervisory observations. The six treatments were combinations of three independent variables—direct, indirect and no supervisory feedback—and other two independent variables—being video-feedback and no video-feedback. The two criterion variables were teachers' monologue and pupil participation showed that a combination of videotape-feedback with supervisory conferences produced significantly greater changes in teacher verbal behaviour than supervisory conferences without videotape-feedback.

Claus (1968) in the study already mentioned on the effects of various modelling and supervisory variables on the teacher's use of higher-order questioning concluded that the supervisor added nothing to the effectiveness during the video-feedback, but that the supervisor's contribution to the modelling introductory phase was significantly useful. A study by Olivero (1964) suggests that trainees benefit more from some kind of feedback than from self-analysis, that university supervisors were able to produce greater changes on selected behaviours than did school supervisors, and that verbal-feedback plus video-feedback produce more change than does verbal feedback from supervisors alone. McIntyre (1971) in a study carried out at Sterling, found it not possible to isolate the contributory effects of three kinds of supervisory treatments, but did conclude that for his sample of Scottish students the provision of supervisors seems necessary, in that most students considered it beneficial to have access to authoritative guidance. Finally, an interesting study by Tuckman and Oliver

(1968) compared pupil-feedback against supervisor-feedback. They found that pupil-feedback did produce a significantly greater change in teacher behaviours than supervisory-feedback and, that supervisory-feedback alone also produced changes in teacher behaviour but these changes were away from the direction suggested by the supervisor.

It is this element of feedback that has led to the controversy over role of self-confrontation as a feedback device. Since Acheson's (1964) study, there has been a consistent emphasis upon the value of self-confrontation using television. Exploration work in comparing the effects of videotape- and audiotape-feedback by Gall, *et al.*, (1971), Shivley (1970) and Acheson and Tuckery (1971) suggests that for some skills audiotape-feedback can be equally effective and possibly superior to the videotape mode. These skills are likely to be those which are largely verbal in nature where visual data may be irrelevant and possibly distracting. However, Davis and Smoot (1969) have shown value of audio-aided-feedback, while numerous authors including Doty (1970) and McIntyre (1971) have drawn attention to the desirability of the feedback being provided by a supervisor. Fuller and Manning (1973) in their review on self-confrontation stated that unless some other focus, perhaps some powerful focus is provided, self viewers seem to focus on themselves— their appearance— body and voice.

Role of the Supervisor

As Allen has said, once past an initial acquisition state, the performances of a newly learned skill may show signs of regression for sometime, but eventually a more competent level of performance will be reached. To test this possibility, studies of a longitudinal nature need to be performed. The post-training tests reported to date may not reveal the importance of the supervisor, as they may have measured initial improvement only. It is possible that supervisors' talents are more appropriate for helping teachers adopt newly learned strategies to their particular subject and situation. The role of the supervisor should, therefore, be situated to try to identify the unique advantages of supervisory assistance so that this resource may be utilized more effectively. Results of unpublished studies at the University of Stirling (UK) suggest an additional factor which needs to be considered further. The results of these studies on acquisition of various skills support the idea that improvement in performance is not significantly increased by the presence for supervisory assistance. Research is needed to find out if these opinions had been generalized from training on certain skills or whether trainees saw the need for supervision on all skills (Morrison and McIntyre, 1974). According to Griffiths (1973), there is need for syste-

matic analysis of the behavioural components of microteaching supervision skills. There is considerable scope for the development of a variety of supervisory strategies, and systematic manipulation of this variable in future research should help us to come to firmer conclusions about conditions under which supervision is effective in promoting skill acquisition.

There are various other aspects of microteaching which have been studied largely relating to procedural matters such as length of lesson, length of time between teach and re-teach, delay of feedback, size of classes and content of the lessons, etc. Although the studies reviewed here need to be replicated, results obtained thus far about microteaching procedures have been fairly substantial and consistent. It seems fair to assert that microteaching has been shown to be an effective and efficient way of changing teachers' behaviours in a specified direction, and that this change in behaviour seems to be amenable to transfer to the classroom and to be relatively permanent.

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Anxiety and Academic Achievement

A Review of Research

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This article reviews 120 studies dealing with important self-report anxiety measures, major theoretical models of anxiety, research on the relationship between anxiety and academic achievements and research on reducing the interfering effects of test anxiety and its impact on academic performance. The reviewed studies were conducted in Australia, Britain, Canada, India and USA. The most consistent general findings are : (i) high anxiety is connected with relatively low performance at both the school and college level ; (ii) anxiety is differently related to achievement in different school and college courses ; (iii) specific anxiety scales are better predictors of academic success than are general anxiety scales; (iv) there is an evidence of anxiety \times intelligence interaction. Moreover, the need for research on various strategies for reducing the detrimental effects of anxiety on a academic performance has been stressed. In addition to providing a critical evaluation of the designs of various studies and difficulties in integration anxiety research, various suggestions for further research have also been given. Finally, the importance of a careful calibration of anxiety scales in different language systems has been pointed out so as to facilitate more meaningful cross-cultural research.

IN RECENT YEARS, there has been a gradual recognition of the fact that personality and motivational variables are important correlates of scholastic achievement in the same way that intellectual aptitudes have been

regarded as being important. Personality theorists have shown considerable discrepancy between the potential and scholastic performance and hold that personality attributes, especially anxiety, are significant factors in producing this discrepancy. While consensus is still lacking with regard to the conceptual meaning of anxiety, and there is as yet little agreement as to how it should be measured, nevertheless, considerable progress may be noted in these areas during the past two decades.

A. Important Self-Report Anxiety Measures

The Taylor (1953) Manifest Anxiety Scale (MAS) and the Mandler-Sarason (1952) Test Anxiety Questionnaire (TAQ) were the first of a number of psychometric instruments developed to assess individual differences in anxiety in adults. Some of the other important instruments designed to assess anxiety in adults have been constructed by Cattell and Scheier (1963); Endler, Hunt and Resenstien (1962); McReynolds (1968); Spielberger, Gorsuch and Lushene (1970); Zuckerman (1960); Alpert and Haber (1960); and Sarason (1972). A number of self-report scales have also been developed for measuring general and test anxiety in Children (e.g. Castaneda, McCandless and Palermo, 1956; Sarason, Davidson, Lighthall, Waite and Ruebush, 1960; Phillips, 1960; Spielberger, 1973). Commonly used anxiety scales in India are: Indian version of Taylor (1953), Manifest Anxiety Scale (Krishnan, 1966), Cattell's (1963) Anxiety Scale, Sinha Anxiety Scale (Sinha, 1966), Dutt Anxiety Questionnaire (Dutt, 1964), and Sharma Manifest Anxiety Scale (Sharma, 1970). Recently, Nijhawan (1972) developed Hindi and Punjabi versions of Test Anxiety Scale for children (TASC) and General Anxiety Scale (GASC) standardized by Sarason, *et al.* (1960). Using these scales, Nijhawan (1972) has reported a number of remarkable studies dealing with the enquiry into the determinants of anxiety in elementary school children with a specific emphasis on the role of parental attitudes, childhood experiences, family structure and tensions as determiners of anxiety. Moreover, Spielberger, Sharma and Singh (1973) have developed the Hindi edition of the State-Trait Anxiety Inventory (Spielberger, *et al.* 1970) which provides measures of State-anxiety and trait-anxiety. In a series of studies, Spielberger, *et al.* (1973) has shown that the Hindi (STAR) provides internally consistent, reliable and valid scales for measuring state and trait-anxiety. Marathi translation of the Children Manifest Anxiety Scale (CMAS) developed by Castaneda, *et al.* (1956) has also been provided by Durratt (1965).

Academic achievement has been measured by performance on standardized tests, grade-point averages in total courses or in individual courses, scores of essay-type examination, etc.

B. Major Theoretical Models

Two major approaches have been used to investigate anxiety-performance interaction. The first of these derives from the Yerkes-Dodson 'Law' and conceives anxiety as a generalized state of arousal or emotionality. It leaves the reasons for performance decrements unspecified except that it postulates some type of interference from autonomic drive or from high arousal through the ascending reticular formation. This theoretical framework postulates an inverted U-shaped relationship between anxiety and performance. Apart from a number of useful suggestions by Easterbrooke (1959) and Wachtel (1967), however, the nature of interference still remains to be elucidated.

The second major theoretical approach has a Hullian basis. It considers anxiety as a drive and postulates mechanisms of response competition to account for performance decrements. Response competition theory appears to have attracted the greatest amount of support (e.g. Spence and Spence, 1966). An important feature of the theory is the necessary assumption that the energizing characteristics of high anxiety drive would increase the number of competing response tendencies drawn from a wider range of a response repertoire when new responses had to be learnt. Its fertility has been seen in the work by the Sarasons and their associates (e.g. Mandler and Sarason, 1952; Sinha and Singh, 1959; Sarason, 1961; Sarason, *et al.* 1960; Sarason, Hill and Zimbardo, 1964; Singh, 1968; Spielberger, 1966; Nijhawan and Cheema, 1971, Sharma and Wangu, 1976) and many others. The response competition theory was refined by Broen and Storms (1961) by drawing attention to possible ceiling effects for dominant habits so that further increases in drive would strengthen only competing responses. Spielberger (1966) has extended the drive theory to incorporate the individual differences in intelligence. The implications of this extension has been discussed by Gaudry and Spielberger (1971). There has been further elaborations and specifications of the arousal concept of anxiety implied by drive theory. These re-analyses have started to emphasize cognitive components that distinguish between anxiety and other emotions such as anticipation and uncertainty (Lazarus and Averill, 1972); expectancy, incongruity and response unavailability (Epstein, 1972); the presence of self-depreciation and rumination (Sarason, 1972) or of task irrelevant self-insruction (Mandler, 1972) in the performance of test-anxious subjects. Wine (1971) suggested the attentional interpretation of the adverse effects which test-anxiety has on task performance. During task performance the highly test-anxious person divides his attention between self-relevant and task-relevant variables, in contrast to the low test-anxious

person who focuses his attention more fully on the task. This interpretation is supported by literature from diverse areas. Sarason, Mandler and Wine appear to come close to a new conceptualization of the role of anxiety in performance decrement by considering it as interference from task-irrelevant information. Hamilton (1975) has elaborated the Broadbent's theory of a limited capacity information system (Broadbent, 1971) to provide a novel approach to the explanation of information-processing deficits associated with anxiety interference. Various implications of this informational approach to anxiety has also been discussed by Hamilton (1975).

C. Anxiety and Academic Achievement

In this section various researches conducted in Britain, USA, Canada, Australia and India have been reviewed. This research has been divided into two sub-heads, one for the studies conducted on school samples, and another for college samples.

(a) *Studies on school samples* : There is a good number of studies in which the CMAS scores of children, primarily between ages 10 to 12, have been related to the measures of achievement. These studies reported low, negative but significant correlations between anxiety and achievement (McCandless and Casteneda, 1956, Cowen, *et al.*, 1965 ; Phelps, 1968 ; Keller and Rowley, 1962). Essentially the same relationship holds when other anxiety indices, such as the TASC has been used (Broen, 1959 ; Atkinson and Litwin, 1960 ; Davidson, 1959 ; Sarason, 1963 ; Reubush, 1963 ; Caplehorn and Sutton, 1965 ; Carrier and Jowell, 1966 ; Mwroy, 1968).

Sarason (1963) suggested that anxiety scales which are specific to certain kinds of situations may prove to be more useful in academic situations than the general anxiety scales. His results supported this suggestion. There was a more significant negative correlation between test-anxiety and achievement than between general anxiety and achievement. Negative correlations were also stronger for females than males. Lunneborg (1964) administered three anxiety scales—TASC, CMAS, GASC—to 213 boys and girls in Grades IV to VI. There was a negative correlation between anxiety and achievement measures for each grade. Here, too, negative correlation between TASC scores (specific anxiety measure) and achievement scores tended to be larger than was the case for other two general anxiety measures. Further, the negative correlations tended to be larger for boys than for girls. Similar results have also been reported for elementary school children by Sarason, *et al.* (1960); Stevenson and Odom (1965); Frost (1968); Levy, *et al.* (1969). But in Stevenson and Odom (1965) results the negative correla-

tion between test-anxiety and achievement was more or less equally strong for both boys and girls of Grades IV and VI. Similar results that there is no consistent pattern of differences for boys and girls were reported by Hill and Sarason (1966). Gaudry and Spielberger (1971) concluded on the basis of similar other studies that "the most likely conclusion appears to be that the relationship between anxiety and achievement is equally strong for the two sexes overall, but this relationship may vary as a function of complex situational factors, such as the sex of the teacher or a teacher's value system." McKeachie (1969) has shown that when students are taught by teachers characterized by expectations of high standards, the relationship between anxiety and achievement is effected.

Two studies, on the school samples, have supported the Yerkes-Dodson 'Law', which states that the relationship between motivation (anxiety) and learning takes the form of inverted U-shaped curve which means that the optimum level of motivation for effective performance lies in the middle ranges, rather than at the high or low ends. Cox (1960) evaluated the school marks of ten and eleven-year old boys as function of anxiety level measured by the TAs. The results supported the Yerkes-Dodson 'Law' in that the Ss in the middle ranges of anxiety were best achievers. Sharma (1970) investigated the nature of relationship between manifest anxiety and school achievement of 700 Indian adolescents. The eta coefficients for the whole group and for the boys were significant beyond the .01 level, while the eta coefficient for the girls was significant at the .05 level. The conclusions were that the relationship holds for both males and females.

The studies discussed earlier had taken up total achievement scores. However, there is a good number of studies that attempted to investigate the relationship between anxiety and achievement in different school courses. Lynn (1957), on British samples of Grades IV and VII children, and Cox (1964), on Australian samples, reported significant negative correlation between test-anxiety and arithmetic. These results are consistent with other studies by McCandles and Casteneda (1956) and Sarason, *et al.* (1960). Further, Lynn (1957) and Cox (1964) reported that reading scores were uncorrelated to the TASC scores. On the other hand, Sarason, *et al.* (1960), Stevenson and Odom (1965) and Kestenbaum and Weiner (1970) reported that reading achievement was more negatively correlated with test-anxiety than arithmetic. In their longitudinal study, Hill and Sarason (1966) reported that reading and anxiety (TASC) were more strongly correlated in the early grades than arithmetic and anxiety. They further concluded that reading-anxiety correlations and anxiety-arithmetic correlations tended to become more similar in the later grades. They have also suggested the possible explanations for these findings.

In a study by Reese (1961), arithmetic test was given under a time limit to children of Grades IV and VI. The scores on the CMAS were negatively correlated with arithmetic achievement. Partialling out IQ had little effect on the correlation, but also the combination of anxiety with IQ did not appreciably increase the accuracy of predicting performance. They concluded that although the relationship between manifest anxiety and performance is not a result of the relationship between anxiety and intelligence, manifest anxiety has relatively little influence on scores on achievement test used in this study. Further, Feldhausen and Klausmeier (1962) and Lunneborg (1964) found no consistent differences in the relationship between anxiety and achievement in arithmetic and reading.

Keller and Rowey (1964), on a sample of Grades VII and IX boys and girls, found the CMAS scores negatively related to science achievement. Gaudry and Bradshaw (1970), using TASC scores for pupils of 14 secondary classes, correlated these scores with mathematics marks in both progressive and terminal examinations. The results were that high test-anxious groups performed worse than their low test-anxious counterparts. Moreover high test-anxiety had a less interfering effect under progressive examining than under terminal examination. This supported Sarason, *et al.*, (1960) claim concerning the effect of test-anxiety on performance in situations varying in 'test'-like characteristics. The implication for education is that a change in the conditions of examining effects high anxious and low anxious differentially. An increase in emphasis on formal examining places high anxious pupils at a disadvantage relative to the less anxious while the introduction of progressive assessment favours the high anxious. Ruston (1966) also reported a significant negative relationship between anxiety, verbal reasoning, arithmetic, English and school record.

Most of the studies reported earlier did not control intelligence or systematically vary it. This raises the possibility that the relationship between anxiety scores and academic achievement may be obscured by an intelligence by anxiety interaction. Accordingly, Gaudry and Fitzgerald (1971) analysed the performance of junior high school pupils on a variety of school courses as a function of test-anxiety and intelligence. School marks were taken in English, mathematics, history, geography, French and science. Using a multivariate analysis, the performance of children in Grade XII was examined as a function of anxiety and intelligence. Considerable support was found for the experimental hypothesis that high anxiety would tend to facilitate the performance of most able students while lowering that of the remainder when compared with their low anxiety counterparts. High anxiety was found to be associated with the greatest performance deficit at the second highest of the five levels of ability.

There are, however, some studies which found no relationship between anxiety and achievement measures on the school sample (Wirt and Broen, 1967; Kitano, 1960, L'Abate, 1960; Chasboll and Thomas, 1967).

(b) *Studies on colleges samples* : A number of studies have also been conducted on college population. Spielberger and Katzenmeyer (1959), using Taylor's MAS, reported a significant negative correlation between anxiety and grade-point average. They further determined the effect of intellectual ability on this relationship. It was found that grades varied inversely with anxiety, at a higher significant level, for the average scholastic aptitude Ss. The college work appeared to be too difficult for the low aptitude Ss whose poor grades were unrelated to their MAS scores. High aptitude students tended to obtain good grades regardless of their anxiety level. In another study, Spielberger (1962) investigated this relationship taking into account the intellectual levels of students. He found that anxious students (MAS) in the middle ranges of ability obtained lower grades than non-anxious students of comparable ability. Students of low ability earned poor grades irrespective of their anxiety level. For the very superior students (those with ACE scores above 150), it appeared that anxiety had actually facilitated academic performance. But Pervin (1967) using Albert and Haber (1960) AAT, correlated anxiety with measures of academic performance. Low negative correlation was obtained. The moderator analysis did not indicate that anxiety was differentially related to performance for different ability levels. Carrier and Jewell (1966) used the TAS and the AAT and correlated these scores with final examination score of 125 multiple-choice questions. They also obtained significant negative correlations. Earlier, Alpert and Haber (1960) had compared the gross ability of six anxiety scales to predict college achievement. Their results showed that specific anxiety scales like the TAS, AAT—, AAT+ tended to have higher negative correlations with measures of academic achievement than general anxiety scales like the MAS. Intelligence was not considered. Sarason (1961) studied a sample of 326 males and 412 females of introductory psychology classes. Personality variables correlated with achievement in 13 intellectual measures were test anxiety, general anxiety, lack of protection, hostility, need for achievement and defensiveness. For both males and females, only test-anxiety correlated negatively and significantly with 11 of 13 intellectual measures including English, mathematics, foreign language, social science, etc. Bronzaft (1967) studied 840 college students introducing additional variable of social mobility. He found that test-anxiety score correlated negatively (but at a significant level) only for the socially mobile group. Further Sassenrath (1967) and Endler (1964) reported significant negative correlation between test-anxiety and achievement.

Sinha (1961) administered two general anxiety scales to a sample of 165 engineering students, aged 19 to 24 years, who were divided into sex groups belonging to the most popular to least popular courses. Although no data on intelligence test were considered, it was rightly assumed that the sample comprised the boys with superior intellectual calibre and had high academic attainment. For academic performance, not only the performance of the students at any one examination, but a cumulative overall index of their academic performance was used. When the sub-groups were considered, except for two groups who belonged to the most popular course, rank-difference correlations for the academic rank and scores on the anxiety scales were found to be very low or negative. But the pooled correlation for all the six groups was found to be -0.155 ($t=4.82$), which was significant at one per cent level. Therefore, it was concluded that there existed a small, though significant, inverse relationship between anxiety and academic performance. Similar results have been reported by Saxena (1965), Sinha (1966) and Hundal, Sudhar and Sidhu (1972) on different Indian samples of college and university population. Only one study at college sample by Fein (1961), using IPAT anxiety questionnaire, provided evidence for a curvilinear relationship between anxiety and achievement. There are, however, some studies which found no relationship between anxiety and academic achievement (e.g. Calvin, McGuigan and Sullivan, 1957; Davids and Eriksen, 1955; Matarazzo, *et al.* 1954; Sarason and Mandler, 1952; Grooms and Endler, 1960; Buchin, 1966).

D. Reducing the Interfering Effects of Test Anxiety

One aspect of criticism of the assessment process in education is the claim that the stress of the formal examination results in such high degrees of anxiety in many students that they are unable to perform at the level which matches the potential they have shown in less stressful situations. Some studies by Sinclair (1969), Sieber and Katmya (1967) and Paulson (1969) have suggested a method of reducing the interfering effects of anxiety during examinations. This method involves providing the student with some kind of memory support (just like the open-book examination). These investigators found that high anxious students in Memory Support (MS) condition made fewer errors than high anxious students in No Memory Support (NMS) condition. On the contrary, O'Neil, Spielberger and Hansen (1969) did not get these results for trait-anxiety and errors but the predicted relationship was found between state-anxiety, memory support and errors.

Sarason (1972) has discussed the details of other techniques of reducing

the interfering effects of test-anxiety, namely, reassurance, observation of models, and pre-performance information. Wine (1970) provided the subjects intensive six-hour training programme in which they worked on tasks under instructions to attend to the task and not to themselves. The subjects were also given the opportunity to observe a videotaped model, which displayed productive attentional behaviour. Wine's two major findings were that the attentional treatment (i) reduced the degree to which the subjects reported experiencing anxiety, and (ii) increased their levels of performance on several tasks.

Spielberger, Weitz and Denny (1962) showed that those anxious freshmen who regularly attended group-counselling sessions showed more improvement in their academic performance than students who were not counselled, or who did not regularly attend counsellings. But Garlington and Cotler (1968) and Emery (1967) reported that changes in test-anxiety by systematic desensitization were not significantly reflected in better performance of course examination and final grades.

Programmed instruction provides another technique to cope with the problem of individual differences in test-anxiety. From Sarason's point of view, this approach provides a learning environment in which the anxious student should not be at disadvantage. Although the empirical results are equivocal, Tobias and Williamson (1968) present an argument that the subjects should benefit more from programmed instruction than LA subjects. They hypothesized that programmed instruction minimizes personal evaluation reduces difficulty, and decreases the stress caused by uncertainty. Further, programmed instruction does represent a fairly well-structured, non-stressful situation as a rule, it would seem plausible to expect high test-anxious subjects to work faster and show greater proficiency than low test-anxious subjects on this type of task. This hypothesis has been supported by studies conducted by Campeau (1968), Kight and Sassenrath (1966), Ryan (1968) and Gifford and Marston (1966)— all providing results in the predicted direction. But Flynn and Morgan (1966) reported no real differences between the performance of HA and LA subjects. It may be pointed out that the influence of anxiety on programmed instruction has not been fully explored in Western countries and the least in our own. Many more studies are required with different samples and programmed materials to evaluate the utility of programmed instruction to nullify the effects of high anxiety.

Some of the positive aspects of programmed instruction can be instituted in the regular classroom. For instance, moderately graded learning steps might be brought to bear on the classroom learning environment, memory support may be introduced for students, especially anxious

students through a variety of external aides such as diagrams, mnemonic devices, outlining systems for organizing materials, etc. (Sieber, 1969).

E. Conclusions and Comments

A perusal of various studies reviewed in this paper shows that there is a conflicting evidence as to the nature of anxiety-achievement relationship both at school and college level. This is not surprising in view of the differences in age, intelligence, socio-economic status, geographic location, cultural background, educational system among the samples studied, not to mention the actual differences in the criterion of achievement test used, i.e. the ways used for scoring academic achievement. While all the measures of achievement may well show fairly high correlations, they shall represent alternate definitions of attainment, which could have different personality correlates. Indian students who are examined less frequently but through a more stressful examination may show different anxiety-achievement relationship than their counterparts in Western countries (Sharma, 1970). Thus, examining conditions and learning environments may have appreciable influence on anxiety-achievement relationship.

In spite of these factors, the most consistent general finding is that there is a small but significant negative correlation between different measures of anxiety and variety of measures of achievement. It has also been found that specific anxiety scales (e.g. TASC, TAQ, TAS) are better predictors of academic success than are the general anxiety scales. Evidence has further been provided that there are different relations between anxiety and achievement in different school courses such as foreign language, arithmetic, science, social sciences, etc. Thus, it would be important to investigate how anxiety is related to different school and college courses rather than taking total or aggregate achievement scores. Further, anxiety scales should be administered in close proximity to the achievement test.

As intelligence is highly correlated with academic achievement, it would be desirable to either control intelligence or include it as a moderator variable. A low negative correlation between intelligence as measured by various instruments and anxiety is the result of majority of investigations. However, the relationship is higher and more consistent in the studies of children (e.g. Ruebush, 1963), and when the TAS or TASC was used as measure of anxiety and when the MAS or CMAS was used (e.g. Sarason, 1967). Spielberger (1958) explains such results by pointing out selection factors that operate in college students reduce the range of intellectual ability present in the sample and thus lower the correlation between these two variables. The relationship between anxiety and intelligence is parti-

ularly important because of its causal implications since a number of studies have supported the proposition that anxiety and intelligence have interactive effects on performance (e.g. Davidson, 1959), Spielberger and Katzenmeyer, 1959; Spielberger, 1962; Paul and Erikson, 1964; Waite, Sarason, Lighthall and Davidson, 1958; Feldhusen and Klausmeier, 1962; Gaudry and Fitzgerald, 1971). It seems likely that the relationship between anxiety and academic achievement is a complex one and cannot be ascertained by two-variable correlational procedure.

Most of the research reviewed in this article involved the use of correlational technique. While this method of analysis has distinct advantage in terms of ease of communication, it does have definite weakness. Firstly, cause-effect generalizations cannot be made. It is possible to dismiss a non-linear relationship in reporting a non-significant product-moment coefficient of correlation and also to ignore the possibility of important interaction between the variables. Further, correlations average out the relationships over the whole sample ignoring possible differences between sub-groups. Thus, correlational technique, when used, should be sub-groups when these are known in advance. It would be better if multivariate experimental design are used while designing various experimental studies (e.g. Spielberger, 1962; Gaudry and Fitzgerald, 1971). Moreover, Sarason (1972) points out the experimental evidence is of great significance for the expansion of monological network of a construct. The advantage of correlational explorations is that these can be closely linked to the process of construct validation :

While correlational and experimental explorations are occasionally seen as being at odds with one another, they share a complementary relationship. This is certainly true in so far as performance on intelligence, achievement and aptitude tests is concerned (Sarason, I.G., 1971, p. 382).

Further, various findings suggest a number of questions. If anxiety factors do play a considerable role in performance on academic tests, how much of the variance in academic achievement is a result of these factors? What non-anxiety personality variables interact with anxiety to influence examination performance? Do the effects of anxiety vary with the type or mode of examination (recall, recognition, etc.)? What situational conditions effect examination performance? Can the detrimental effects be reduced? Is there an interaction between teacher's personality and performance of children differing in anxiety?

Sarason (1972, p. 399) has pointed out an important lacuna in the research on test-anxiety that concerns the person who scores in the middle range of the score distribution. Existing research evidence concerning

midrange scores includes a number of ambiguous and contradictory findings. Should scores along with the general or test-anxiety dimension be viewed as reflecting gradual increments in the habits that are part of test or general anxiety syndrome? Or, are high scorers a somewhat separate and distinct group from other persons in the score distribution? Advancement in the assessment of test/general anxiety are required to support advances in experimentation (Allen, 1970).

Anxiety (general and test) has been described and measured in a variety of ways. It is not immediately apparent which considerations should most influence selection of an anxiety assessment procedure. Spielberger's work on trait- and state-anxiety is a significant contribution in this area (Spielberger, 1975). Failure to distinguish between state-anxiety and trait-anxiety has made the literature in this area more difficult to interpret. In spite of the fact that anxiety is one of psychology's most researched concepts, there is still much effort put into correlating various anxiety instruments to further clarify what anxiety measures are measuring (e.g. Crumpton, *et al.* 1970; Feld and Lewis, 1967). A little work has been done to assess the relationship among the anxiety measures used in India. Hundal, Sudhakar and Sidhu (1970) made such an attempt using the Taylor MAS (Krishan, 1966), the N-scale of the MPI (Singh, 1964), Sinha Anxiety Scale (Sinha, 1966) and the Dutt Anxiety Questionnaire (Dutt, 1964). They found that inter-correlations among these measures ranged between .65 to .82 and this indicated that there is much in common among these measures of trait-anxiety. Spielberger, Sharma and Singh (1973) also concluded that the Cattell IPAT Anxiety Questionnaire, Sharma Manifest Anxiety Scale, the Hindi State-Trait Anxiety Inventory (STAI) and Taylor MAS are correlated among themselves and the values of 'r' ranged from .64 to .91. Sarason (1959, 1961) has reported correlation between the TAS and the MAS in two separate studies. The correlation varied from .41 to .53. Although the correlations are significant, it does imply that different anxiety measures which have been used imply different operational definitions and are characterized by different theoretical models. This point is further strengthened by the studies which investigated the factorial structure of different anxiety measures (e.g. Crumpton, *et al.* 1967; Feld and Lewis, 1967, Phillips, 1966; Dunn, 1965). In a more recent study in India by Hundal, Singh and Singh (1972), Cattell's ASQ and Eysenck's N-Scale were found to be factorially pure and more or less comparable, whereas the MAS and the SAS were factorially complex, but between themselves they were comparable. This could be expected because the origins of these two types of anxiety-tests are different. Eysenck's and Cattell's tests are based on factor theory, whereas Taylor MAS and the SAS are based on anxiety syndrome described

in the MMPI. Thus, it becomes difficult to compare and integrate various research findings because each theorist incorporates different components of anxiety in his definition and consequently uses different measures. Here it will be appropriate to mention Sarason's (1966) reservations about anxiety scales. He questions whether such scales

reflect the tendency to experience and manifest frequently the overt behavioural characteristics of unambiguous anxiety... high scores reflect attitudes, cognitive processes, and experiences which are consequences of unambiguous anxiety and the environment's response to it (pp. 68, 69), and... that the verbal response to our scales may be telling us more about the self than about the effect (p. 79).

There can be no disagreement with Sarason's position that anxiety scales do not measure only anxiety. Sarason is probably right in stressing that the avoidance anxiety becomes as important as the experience itself. Thus, refinement and modification in psychometric measures of anxiety is needed.

A special mention need to be made of factor analytic studies of Liebert and Morris (1967) and Spiegler, Morris and Liebert (1968) who found that anxiety as measured by the TAS could be thought of as two orthogonal factors, one being worry (W), and the other being emotionality (E). Worry is defined as cognitive and intellectual concern about one's own performance. Emotionality is defined as autonomic reactions to the stress of examination situation per se (Morris and Liebert, 1970). One sample of 95 college students reported a significant negative relationship between worry (W) and test performance. But neither emotionality (E) nor pulse rate related to performance on the academic test. Thus, worry (W)—the cognitive component of anxiety—affects performance on intellectual tests, whereas emotionality (E) has no such effect. Spielberger (1976) has developed a 20-item scale which provides separate scores on worry and emotionality. It seems appropriate to consider these components of test-anxiety separately while designing studies to investigate the relationship between anxiety and performance. It is possible that much of the inconsistency found in anxiety research is also due to a failure to account for these and other components of anxiety.

Very little work has been done in India on the various therapeutic strategies which are used for reducing the interfering effects of anxiety (test of general). Besides these studies, comparative studies to investigate the relative effectiveness of various treatment approaches are also needed.

Finally, cross-cultural investigations in anxiety are needed as these will

contribute important insights in our understanding of human nature. This will also help us to establish the generality of the findings of a good number of studies conducted in Western countries. But cross-cultural research requires a careful calibration of psychological scales in different language systems. The translation of a psychological inventory from the original language inevitably raises many complex theoretical and methodological problems. Spielberger and Sharma (1976) has considered a number of general issues that are encountered in the cross-cultural measurement of anxiety and has also discussed the specific strategies that have proved useful in developing translations of the State-Trait Anxiety Inventory (Spielberger, *et al.*, 1970) into 22 different languages of the world including Hindi. Following these strategies, it should also be useful to develop translations of the Hindi STAI into various Indian regional languages.

To conclude, the area of research covering anxiety-learning-achievements has great significance for psychological theory and educational practice. These are formidable obstacles to research of this kind, but it may be crucial to overcome them.

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Modernization and Education

The Role of Secondary School Curriculum

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INDIA is passing through a period of transition. The old economic and social structure is breaking up and a new one is emerging. In this process of rapid change, new problems are being thrown up in every sphere of social life. This transformation needs to be ordered and peaceful to minimize chaos and human suffering.

A nation which is undergoing transition from a traditional to a modern twentieth century way of life must chalk out educational policies which can act as a bridge between the traditional values of its people and the new ones in the life style which it is seeking to adopt.

The dependence of modern society on formal education is obvious. Without elaborate organization the survival of the vast contemporary civilization would be impossible. In some of the developing nations today, a major obstacle to economic growth is the underdeveloped ability of the people either to use modern technology or to participate effectively in complex formal organizations.

Of all the major institutions of society—Family, Economy, Polity, Religion and Education—the investigator has selected education as the most strategic for introducing modernization as education has come to

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mean a lot more than mere instruction. It is viewed as the total process by which a society perpetuates itself.

In India, with the introduction of the new educational structure, the courses of study at all stages emphasize three fundamental values :

- (i) Dignity of manual labour through the use of work as a part of the educational programme;
- (ii) a sense of social awareness and social responsibility through the involvement of students and teachers in meaningful programmes of community service; and
- (iii) the promotion of secular outlook or *Sarvadharmā Samābhava* through a proper understanding of the fundamental unity of all religions.

Therefore, the new curriculum which is framed will have to reflect these values, besides the ideals, knowledge and skills that are believed to be significant or are related to the common activities of the members of society. In other words, it will have to be interwoven with the social fabric that sustains it. This syllabus aims at producing young people who are vocationally as well as socially efficient and can work successfully in the socio-political life of the society.

Besides, the contents which have gone into the syllabus of the subjects prescribed are forward-looking. Important developments in the respective areas have been incorporated; stress has been laid on recent scientific, technological, social and economic developments in sciences and social sciences. To broaden the outlook, developments in other parts of the world too have been put in proper light while changes on the national scene receive greater importance.

In short, this curriculum is an important aspect in the context of modernization and education, and hence an investigation into its role may throw some light on how the study of some of the courses help in bringing about a change in personality of the students. So, it would be worthwhile to investigate the problem 'Modernization and education: The role of secondary school curriculum,' by analysing the content matter in the context of social change and modernization in contemporary India.

The Purpose of the Investigation

- (i) To examine modernization and education by ascertaining conditions and describing situations which make education change the traditional society into a modern one, and also what modernization

- means in the context of this society;
- (ii) to determine the role of secondary school curriculum (new) in making a 'new generation' of modern men and women with a new set of skills, values, attitudes and the cultivation of a new set of norms.

However, there are certain expectations, for example, assuming that the school performs the role of modernization within its framework, the curriculum with its look toward vocation, toward social intelligence and also toward the cultural enrichment of individual life, will bring forth 'a modern man'. This is to be tested by an analysis of the course offerings and the textbooks pertaining to those courses.

Procedure of the Investigation

The effectiveness of curriculum as an agent of modernization or social change can hardly be studied scientifically till a systematic and sophisticated methodology is developed and applied. After the problem under investigation was tentatively selected, exploration of the literature relating to the problem was undertaken to determine which of its aspects might profitably be investigated. Not only current literature was surveyed but the literature developed during a period of years was taken cognizance of.

The sources of related literature which have been tapped by the investigator fall into three categories: (a) Researches—M.A. and Ph.D., (b) Books, and (c) Educational abstracts, periodicals, journals, newspapers, articles, reports, secondary school syllabus, etc.

The present study is a descriptive study or a status study (known in education) or a qualitative study. This method is concerned with descriptions of facts and conditions as they exist, without imposition of control upon factors influencing the materials under investigation. Here the description of 'status' consists of naming and defining aspects of the units of subject-matter or experiences that constitute a curriculum. The goal is valid and reliable evaluation of curriculum that results in change in personality (of the young pupils), to make them modern to live in a modernizing society.

An attempt is made to study carefully the curriculum and textbooks of few of the courses prescribed in the new pattern of education—like science, work-experience and social studies. The content of these subjects is interpreted so as to reveal something about the nature of the young and its effects upon them. Of course, the evidence is assembled and analysed

with care even though numbers are not used.

The predominant mode of presentation of data is textual as the present study is a qualitative thesis. The results are also presented in the form of explanation, description or narration. Here charts are used to summarize basic facts and to indicate trends.

It may be mentioned that no previous studies have been undertaken which provided data regarding various variables. But in the literature on content analysis of communication materials, certain types of variables have been employed rather frequently under two broad categories: A. What is said, B. How it is said. Besides, the investigator of the present study visited 25 secondary schools of Chembur area to study the status of science, work-experience and social studies in schools curriculum. She had informal talks with the respective subject-teachers regarding the problem at hand and a number of things were revealed like their difficulties, the interests of pupils, etc. and this has been discussed in Chapters V, VI and VII.

Scope of the Investigation

The plan of this thesis is to present as simply and concretely as possible the elements of sociological approach to problems of modernization in general and how the course offerings or curriculum of secondary schools can help in the 'great transformation' modernization of societies.

Chapter 1—Modernization : A Sociological Approach—presents what exactly is modernization and how it departs from tradition. It speaks about the changes in cultural systems, in social systems, in personality and modernization of man—traditional, transitional and modern. This chapter will also consist of the study of literature in detail to some extent, related to the problem under investigation (reference to relevant studies in modernization and social change has been made wherever necessary).

Chapter 2—Modernization and Education—discusses the cultural and sub-cultural variations in education together with the social organization which consists of closer ties with the community and the change in student status. This chapter also deals with the content of education and its importance in modernization.

Chapter 3—Research Design and its Significance for Sociology and Education—consists of a clear and complete statement of the problem investigated, a justification of the problem which by discussion of discriminatively selected reasons, establishes the importance of the problem. This chapter also includes the purpose for undertaking the investigation, the basic assumption, and some expectations to be tested and, finally, the method of procedure and the method of findings. In order to focus attention

on valid objectives and to minimize the danger of overgeneralization, limitations of the investigation are also given.

Chapter 4—Curriculum in the New Structure of Education—discusses this curriculum. As schools have been opened to all classes of population, the question, 'What shall be taught' inevitably has had to be reconsidered. Where more emphasis has been laid on science, work-experience and social studies has been described in this chapter.

Chapter 5—Science and Social Change—highlights the role of science in society and effects of science on society. The values of science and the social consequences of scientific outlook are given due consideration as well. Finally, the teaching of science in secondary schools is discussed and how science is needed to change the thinking habits of the people.

Chapter 6—Work-experience—examines the work ethic and describes how work-experience may lead to the economic development of a society by bridging the gap between education and work. Besides, work-experience tries to do many more things—brings about 'the changes in attitude in children needed for cooperative work, teaches team-work, human relations in the sphere of work and production. It will carry the teacher and the school in the heart of the community and the most important thing is that it will carry pupils to new technological knowledge.

Chapter 7 depicts that the cramming of names of kings and kingdoms, rivers and mountains has now given place to the study of cultural development of society. Besides, it shows how the study of history develops empathy, creates in children attitudes favourable to national solidarity and survival. As regards the study of geography, conditions and environment influence the size of population, occupation of people, stagnation, progressiveness, tastes, social customs, industry, and so on.

Besides, in Chapters 5 and 7, the analysis of textbooks in science and social studies used in secondary schools of Greater Bombay is given to show how the content of textbooks in various subject areas may influence social adjustment, personality or skill in the communicative arts of the younger generation.

Chapter 8—An Assessment : Future Outlook—gives conclusions that are followed by criticisms of method and contribution of previous studies, observations on application of findings. Suggestions for further research are given. However, it is hoped that the tentative findings arrived at in this thesis will lead to more vigorous research in the areas the investigator (of the present thesis) has endeavoured to investigate.

Limitations of the Study

This study has certain limitations which must be taken into consideration. It is at least partial and tentative. It does not have complete coverage of the secondary schools in Greater Bombay. Only 25 schools of Chembur area were visited for necessary information regarding the implementation of work-experience, how that activity is conducted and its impact on pupils. However, there was no time to go to the rural areas for investigation.

Science has, undeniably, made rapid progress, but the primitive society has not kept pace with it. Why? The investigator has failed to get the reply to this question. Then again the discussion of whether social awareness is created by the subject-matter of the various textbooks, whether the attitudes, skills and values of pupils are developed on right lines to help them to change their personalities should, therefore, be taken as indicative rather than conclusive.

As this thesis is descriptive, the presentation of the data is textual with the exception of a few charts. No tables and graphs are used.

The thesis presents the content analysis of only three curricular areas—science, work-experience and social studies—out of seven areas proposed for general education of the first ten years of school education. No priority is given to any subject as all the subjects are equally essential and valuable. It is only the time factor which prevented the investigator from analysing the other subjects.

The curriculum for the ten-year school is discussed and analysed, though at times only a few comments are made about the + 2 stage as it does not come under the purview of this study, but the course work-experience has some bearing on this stage (higher secondary). That is, whatever findings are arrived at, are tentative.

Findings of the Investigation

A perusal of various courses (subjects) in the new pattern of education indicates that they are socially useful to some extent and the content analysis of various textbooks (science, work-experience and social studies) also show that the material presented needs a different approach—it is too descriptive—in order to inculcate right values, attitudes, skills, etc.

Science : The material in the science textbooks is arranged with the hope of achieving the objectives of teaching science in Classes VIII, IX and X. But the actual problems encountered in the implementation of this material are many. They are as follows :

- (i) The subject-matter of physics in all classes is difficult and likely to produce apathy for the subject.

- (ii) A descriptive rather than conceptual approach is used in presenting the science content.
- (iii) Exploration of the field is not emphasized to a great extent.
- (iv) Lack of funds, laboratories for physics, chemistry and biology cannot be provided, scientific equipment not sufficient.
- (v) The reading material in science for children fails to motivate them to develop their curiosity.

Work-experience : In most of the schools, the teaching of work-experience is very ineffective in developing the right kind of social viewpoint among pupils. After interviewing the heads of the respective schools together with the teachers and surveying the facilities needed and provided, the investigator felt an under-current of aversion in most of the schools and came across many sceptic teachers. On the other hand, some of the schools (about four per cent) are seriously trying to make every effort possible to link work-experience with real life situations and thus trying to link education with productivity. The following are the observations :

- (i) No attempt is made by the secondary schools (25) of Chembur area to relate the various activities pertaining to the areas of work-experience to community needs and its service—respective areas are selected on the basis of convenience. About 64 per cent of these schools select potculture. About 28 per cent of these schools select maintenance and repair of stoves. About 20 per cent of these schools select book-binding. Probably, these areas are selected as they require minimum equipment.
- (ii) Teachers are not trained to teach this subject.
- (iii) No special grant is given to schools for conducting work-experience activity.
- (iv) Items of the clusters prescribed in the syllabus are not properly planned, selected and implemented.
- (v) Gulf between education and work.

Social Studies : (i) In social studies courses, a mention of isolated terms is made which does not serve any purpose. The correlation of facts and effects, association of certain events and lines of action, etc. are missing.

(ii) Textbooks published by the State Education Department for Classes V, VI and VII in social studies are not revised and kept up-to-date.

(iii) The way in which material is written in a distorted fashion (discussed in the chapters) indicates also the lack of interest shown by the writers, hence pupils are confused.

(iv) The examination of history textbooks reveals that the treatment given to major happenings is far from satisfactory as their social impact is totally ignored and if mentioned, it is done very casually.

(v) The history textbook of Class X based on the new approach to the study of history may help to develop the national, state and its associated apparatus of democratic functioning. It tries to create in the pupils an awareness of the need for reshaping the world in which he lives.

(vi) Civics means to teachers and pupils, a study of government and its function, nothing more.

(vii) The arrangement of topics in geography textbooks of Classes V to X lack proper synthesis—no correlation of geography with social and cultural development of men.

(viii) The content of social studies syllabus too in each subject is completely unrelated with that of the other. For example, in Class IX pupils learn in history 'Struggle for Democracy in England,' 'Industrial Revolution,' 'Rise of Nationalization and Growth of Democracy in Europe,' and in geography they study 'India.'

(ix) The material is rather lengthy in view of the time allowed for it.

(x) Most of the topics in social studies are rather difficult for the pupils, for example, 'Rise of Democracy in Great Britain—The Abiding Element of Greek and Roman Civilizations'.

(xi) There is a lack of rationalization and humanity and there is an abundance of ignorance, half truths and blatant prejudice.

It seems too early to come to definite conclusions which are definite and specific regarding the change in the personality of the child to fit him in a modernizing society and make him a modern man. But the analysis of the textbooks of various courses indicates that if the curriculum is implemented in an effective manner, it may do the needful. □

Divergent Thinking Abilities and Creative Personality Dimensions of Bright Adolescent Boys and Girls

A Comparative Study

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The Problem

IT IS WIDELY accepted among leading psychologists that the index of intelligence remains unaffected by sex difference. It is most probably in this context that standard tests of intelligence provide common norms for boys and girls. It will be worthwhile to recall Cropley (1965) who conceived intelligence as convergent thinking and Guilford (1967) who visualized the convergent thinking as an integral part of his S. I. model. Among the remaining four components of the S. I. model, the divergent thinking abilities is one. A natural curiosity is to explore whether the divergent thinking abilities also remain unaffected by sex difference. Another similar question is whether the two groups differ with respect to creative personality dimensions.

Hypothesis

- (i) Divergent thinking abilities are not affected by sex difference.
- (ii) Creative personality dimensions are not affected by sex difference.

Factors Related to the Setting of This Study

It would be worthwhile to recall experiences of others in this field. Price and Bell (1965) working on relationship between IQ and divergent thinking abilities revealed that a person with an IQ of less than 130 may not be able to express his creativity in a meaningful way and that persons having an IQ above 130, may not demonstrate one-to-one correspondence between increments in creativity and IQ. Therefore, these two traits tend to demonstrate low relationship. Getzels and Jackson (1962) in their studies on creativity and socio-economic status revealed that parents from the high IQ homes stress greater conformity and exert greater pressure on the child to do well scholastically than parents from the homes of the high creative group. Barron (1955) through his work on personality and originality revealed that originality was related to independence of judgment, to personal complexity, to self-assertion and dominance, and to the rejection of suppression as a mechanism of the control of impulse. Similar other studies can be reviewed in order to drive home the fact that IQ, chronological age and socio-economic status are certain potent factors that are related to creativity. In planning this study, extraneous factors like chronological age, IQ and socio-economic status were taken into consideration.

Sample

Subjects for this study were selected from public schools and A Grade schools of Rajasthan where students come from families of high socio-economic status. The educative environment in schools where students get experiences of different types is of uniform standard. In order to select bright students belonging to high socio-economic groups, Jalota's group test of intelligence and Banasthali Vidyapith socio-economic status scale were used. The SES scale included items on education of parents, their income and occupation. The composition of the sample is given in Table 1.

Table 1

Group	N	SES		IQ		Chronological age	
		Mdn	Range	Mdn	Range	Mdn	Range
Boys	158	16.8	14-21	128	100-197	17.15	17.5-19.3
Girls	162	19.8	14-21	131	100-174	17.25	17.0-18.5

It may be noted that the two groups differ with respect to sex as well as with respect to socio-economic status but are almost equivalent with respect to IQ and chronological age. The insignificance of the differences with respect to the last variable has been established statistically.

Administration and Scoring of Tests and Scales

The tests of divergent thinking abilities were time-bound and hence were administered in small groups. The scales of personality dimensions were free of time limits and, therefore, were administered in large groups. The following tests and scales were administered to measure abilities and personality dimensions as mentioned against them.

Table 2

<i>Test/Scale</i>	<i>Ability/Dimension</i>
1. Word fluency test	Word fluency (DSU)
2. Controlled association test	Associational fluency (DMR)
3. Number rules test	Associational fluency (DSR)
4. Sentence construction test	Expressional fluency (DMS)
5. Word grouping test	Spontaneous flexibility (DSC)
6. Multiple grouping test	Spontaneous flexibility (DMS)
7. Similarities test	Ideational fluency (DMU)
	Originality (DMT)
8. Figural similarities test	Spontaneous flexibility (DFC)
9. Utility test	Ideational fluency (DMU)
	Spontaneous flexibility (DMC)
	Originality (DMT)
10. Remote consequences test	Ideational fluency (DMU)
	Originality (DMT)
11. Plot titles test	Ideational fluency (DMU)
	Originality (DMT)
12. Picture drawing test	Ideational fluency (DFU)
	Spontaneous flexibility (DFC)
	Originality (DFT)
	Elaboration (DFI)
13. Circle test	Ideational fluency (DFU)
	Spontaneous flexibilities (DFC)
	Originality (DFT)
	Elaboration (DFI)
14. A-D scale	Dependency-autonomy
15. C scale	Conformity-nonconformity
16. E-S scale	Strong-weak ego
17. D scale	Closedness-Openness of mind

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The tests and the scales were scored with the help of scoring keys and instructions given in the manuals. The nature of scores were nearly equal interval scale.

Analysis

An attempt was made to examine the equivalence of two groups. The means and standard deviations of IQs of boys and girls were 131.11, 132.39, and ± 17.82 , ± 17.62 , respectively. The values of CR and F ratios were .77 and 1.01 respectively, which helped in concluding that the groups of boys and girls were same with respect to spread and level of intelligence. The two groups were also similar with respect to chronological age since the median in the two groups were 17.15 and 17.25 years. The results are presented trait-wise, in order to test the hypotheses set in the beginning (Table 3).

Table 3
COMPARISON OF BOYS AND GIRLS ON FLUENCY

Test	Trait	Boys		Girls		CR	F,
		\bar{X}	σ	\bar{X}	σ		
1. Word fluency test	Word fluency (DSU)	48.67	19.81	60.69	19.26	6.73**	1.06
2. Controlled association test	Associational fluency (DMR)	20.76	10.89	26.78	10.82	5.90**	1.01
3. Sentence construction test	Expressional fluency (DMS)	23.46	11.92	26.32	17.75	2.06*	2.22**
4. Picture drawing test	Ideational fluency (DFU)	11.19	1.31	10.33	1.89	3.29*	2.08**
5. Circle test	Ideational fluency (DFU)	16.35	4.67	16.63	4.39	.66	1.31**
6. Similarities test	Ideational fluency (DMU)	20.03	6.20	23.73	6.37	6.23**	1.08
7. Utility test	Ideational fluency (DMU)	62.19	21.78	66.83	19.51	2.46**	1.25**
8. Plot titles test	Ideational fluency (DMU)	24.61	9.77	37.50	17.94	8.65**	3.37**
9. Remote consequences test	Ideational fluency (DMU)	51.87	16.00	57.75	17.80	3.62*	1.24**

**Indicates significance at .01 level

*Indicates significance at .05 level

Table 3 reveals the differences in performances of boys and girls on different tests of fluencies. Serial numbers 1, 2, 3, 6, 8 and 9 in the Table demonstrate that mean performances of girls are better than those of boys on the word fluency test, the controlled association test, the sentence construction test, the similarities test, the utility test, the plot titles test and the remote consequence test. These differences when viewed from the point of ability reveal that girls are superior to boys on word fluency (DSU), ideational fluency (DMU), associational fluency (DMR), expressional fluency (DMS). These levels have been found superior especially when the medium of expression was verbal. In figural media, boys' performance tends to be better (Sl. No. 4) than of girls. The media in word fluency is though symbolic yet not totally free from semantic content, because even the symbols were to be presented through words. Thus, this analysis reveals that girls produce more verbal responses if word fluency, ideational fluency, associational fluency and expressional fluency were used in the production of divergent thinking. The null hypothesis is rejected in favour of girls' group as far as fluencies in semantic content is concerned. This phenomenon may be due to the presence of a rich memory storage of word symbols in girls for referents of day-to-day environment. Such a rich storage could be the contribution of wide reading of Hindi periodicals, novels and the like by girls. The craze for novels and language periodicals has been observed among girls of families belonging to high socio-economic status of our society. The situation in case of boys is slightly different since most of them are after the vocation-oriented literature or the literature concerned with their curricular studies only.

The performance of boys on ideational fluency (DFU) as measured by figural tests (Sl. No. 4 and 5) reveal opposite phenomenon. The most probable reason is the difference in the nature of their stimuli. The picture drawing test had unstructured stimuli whereas the circle test had the structured one. Therefore, nothing could be concluded about the superiority of boys with regard to this ability. The differences of the two groups were also observed with respect to their dispersion around the central tendency. The variabilities of girls' group are greater than of boys' group in case of expressional fluency (Sl. No. 3), ideational fluency (Sl. No. 8) and ideational fluency (Sl. No. 9) which indicate that performance levels of girls in respect to these abilities varied more widely than those of boys. Therefore, all the girls should not be estimated to possess higher level of expressional fluency and ideational fluency than the boys.

This set of tests as stated earlier, was used to measure spontaneous flexibility through different contents—symbolic, figural and semantic. The tests in Sl. No. 1, 4 and 5 were single-factor tests, whereas those

Table 4

COMPARISON OF BOYS AND GIRLS ON FLEXIBILITY

Test	Trait	Boys		Girls		CR	F
		\bar{X}	σ	\bar{X}	σ		
1. Word grouping test	Spontaneous flexibility (DSC)	32.51	8.54	31.11	8.21	1.79	1.08
2. Picture drawing test	Spontaneous flexibility (DFC)	9.57	1.67	8.93	2.03	3.53**	1.48**
3. Circle test	Spontaneous flexibility (DFC)	10.65	3.47	11.20	3.52	1.67	1.03
4. Figural similarities test	Spontaneous flexibility (DFC)	23.46	5.46	25.49	6.34	3.55**	1.35**
5. Multiple grouping test	Spontaneous flexibility (DMC)	24.69	7.52	28.89	7.23	6.13**	1.08
6. Utility test	Spontaneous flexibility (DMC)	37.07	10.84	40.94	10.94	3.79**	1.02

** Indicates significance at .01 level

Indicates significance at .05 level

in Sl. No. 2, 3 and 6 were multi-factor tests. Further, the circle test, as stated in the earlier paragraphs, differed from the picture drawing test in having structured stimuli since the later one possessed only the unstructured stimuli. It may be observed that the performance of girls' group is better than that of boys' group on tests of spontaneous flexibility-figural similarities, multiple grouping, utility tests where the subjects were required to demonstrate production of classes intellectually only, i. e. permutations and combinations of verbal figural stimuli were to be carried on mentally and reported without the use of drawing skills or the like. But on tests of spontaneous flexibility where the production of responses is controlled by sketching and drawing of figures, the two groups tend to be equal perhaps due to the inhibiting factor. The conclusion is based on different findings on the two figural tests. On the circle test, mean differences were insignificantly different whereas on the picture drawing test, boys' group demonstrates better performance. These differences may be due to the specificity of the tests. Further, the two groups do not differ significantly in demonstrating spontaneous flexibility in symbolic content as is obvious from the first row. Thus, one can conclude that the null hypothesis has been rejected in favour of girls in case of spontaneous

flexibility in figural and semantic contents but only when the ability is measured by single-factor tests. In case of symbolic content, the hypothesis is retained since no significant difference is found between boys and girls with respect to spontaneous flexibility.

Table 5
COMPARISON OF BOYS AND GIRLS ON ORIGINALITY

			Boys		Girls		CR	F
			\bar{X}	σ	\bar{X}	σ		
1. Picture drawing test	DFT		15.23	4.42	12.95	4.91	5.10**	1.23**
2. Circle test	DFT		23.89	8.63	25.49	9.07	1.91	1.10*
3. Similarities test	DMT		26.80	10.86	33.06	11.94	5.74**	1.21**
4. Utility test	DMT		68.86	27.07	80.60	27.58	4.56**	1.02
5. Plot titles test	DMT		11.84	6.07	15.87	8.28	5.59**	1.86**
6. Remote consequences test	DMT		33.25	12.72	35.66	13.84	1.91	1.78**

Every test in the above list was used to measure two or more than two divergent thinking abilities through figural and semantic contents. Girls demonstrated higher level of original thinking than boys on three tests out of four (Sl. Nos. 3, 4, 5 and 6) tests of originality pertaining to semantic content. The larger variance in case of girls' group is indicative of the fact that this group is more heterogeneous than boys with respect to the levels of originality, i.e. the group must be having high original thinkers as well as some low original thinkers. The mean performance of girls on the remote consequences tests does not negate the trend of superiority of girls' group with respect to DMT, though the superiority has not come out to be significant. Further, the larger variance in girls' group on this test repeats the above-stated phenomenon. As far as originality in figural content is concerned, no clear-cut phenomenon is visible. The boys' group demonstrates high level of originality in figural media but only when this dimension is measured by unstructured stimuli (the picture drawing test). The two groups have shown equal levels of original thinking in figural media when the ability is measured by structured stimuli (the circles test). The contrasting nature of these two tests provides a clue that boys could produce more original ideas specially in response to unstructured stimuli. Thus the null hypothesis is rejected in favour of girls in case of original thinking in semantic content only. In figural media, nothing could be concluded.

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Table 6
COMPARISON OF BOYS AND GIRLS ON ELABORATION

		<i>Boys</i>		<i>Girls</i>		CR	F
		\bar{X}	σ	\bar{X}	σ		
1. Picture drawing test	DFI	15.39	7.39	14.05	9.23	1.65	1.56**
2. Circle test	DFI	22.82	11.42	23.29	12.09	.42	1.12**

The elaboration as the fourth dimension of divergent thinking could be assessed only through figural content. The insignificant critical ratios on the above two tests demonstrate equal capacity of the two groups to elaborate upon an idea. The significant larger variances in girls' group demonstrates that this group possesses girls having high as well as low capacity to elaborate, whereas the boys' group is relatively homogenous in this respect.

Table 7
COMPARISON OF BOYS' AND GIRLS' PERSONALITY DIMENSIONS

		<i>Boys</i>		<i>Girls</i>		CR	F
		\bar{X}	σ	\bar{X}	σ		
1. A-D scale	Dependency-autonomy	-7.14	16.57	+1.75	16.88	5.77**	1.04
2. C scale	Conformity-non-Conformity	-2.37	20.19	+13.00	15.98	9.61**	1.60**
3. E-S scale	Strong-weak Ego	-15.94	11.54	-13.64	12.29	1.93	1.13
4. D scale	Close-open mindedness	-12.95	16.94	-3.29	20.87	5.22**	1.52**

Table 7 states that girls demonstrate autonomy instead of dependence which has been found to be a significant characteristic of boys. The significance of difference in the first row verifies this observation that girls are more autonomous than boys in matters of free thinking, desire to get free, breaking of restraints and defying conventions. A similar phenomenon could be observed about conformity-non-conformity where girls tend to deviate from the social norms whereas the boys' group intends to stick to the set norms especially where conventions, mores, moral values

and group pressure worn to control their behaviour. On the strong-weak ego continuum both the groups show strong ego though the difference in the levels was found insignificant. On the close-open-mindedness continuum, both the groups were found to possess inclination towards the norms set by religious beliefs. The girls' group seems to be more liberal than the boys' group in this connection too. Therefore, one can conclude that the girls' group is more autonomous, non-conformist and less close-minded than the boys' group in matters of thinking, defying conventions, mores, moral values, etc. This is, perhaps, due to the growing desire among women that they have to come out of the set patterns of the society and accept new roles. The new generation of girls perhaps has participated in new roles without sensing the responsibilities and duties pertaining to these future roles. In contrast, the boys' group may have full imagination of their future roles in the society and thereby of future duties and responsibilities also.

Conclusions

The analyses in the above paragraphs tend to suggest that the girls possess higher levels of word fluency, associational fluency, ideational fluency, expressional fluency, spontaneous flexibility and originality than boys but mainly in semantic content. No clear-cut evidence could be obtained with regard to these abilities in symbolic and figural contents. Further, on the figural elaboration the two groups demonstrated performance up to the same level.

The girls' group is also able to demonstrate higher level of autonomy in thinking, non-conformity to conventions and mores and less rigidity in belief-systems than boys. These personality dimensions associated with the divergent thinking abilities would provide girls better chances to grow as creative persons but only in respect of semantic content. This is, probably, due to the fact that the girls tend to keep themselves free from all sense of responsibility likely to occur in different occupations and jobs (Getzels and Jackson, 1962). This study has largely ignored the symbolic content and also adaptive flexibility which are important aspects of divergent thinking abilities.

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On the Estimation of True Scores and Reliability for Tests in the Case of Cluster-Sampling of Persons

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Educational and psychological tests are often standardized by administering them to a sample of persons, which is not a random sample but a cluster sample from persons. Intra-cluster, inter-cluster and overall test reliabilities have been obtained for estimating an examinee's true score in such a situation. Following Lord (1959) and Srivastava and Webster (1967), the least squares estimation procedure is used for the estimation of true scores and reliabilities.

INTRODUCTION

ESTIMATION of the true score of an examinee from his observed score has been a problem of considerable interest in test theory. In various educational and psychological tests, an extensively used model is that of 'randomly parallel tests'. It is assumed that the test items are randomly

selected from a large pool of items and the test is administered to a random sample of examinees from a large population of examinees. But for standardizing these tests, particularly when the subjects are students in schools, it is not convenient to take a simple random sample of examinees and the selected sample is usually a cluster sample. For example, when the universe consists of students of a particular grade (class), then one generally selects a random sample of schools or classes and the test is administered to all students of selected schools or classes. This situation seems to be quite common in a large-scale testing, but the cluster-sampling model has not so far received much attention in test theory. With this model the following reliabilities are conceptualized :

1. The overall reliability of the test which is interpretable as the reliability obtained in the case of random sample of persons from the entire universe of examinees.
2. The reliability for assessing the homogeneity of items with respect to the examinees within a class or cluster. This intra-cluster reliability should be used in the model for estimating an individual's true score in any given cluster (class).
3. The reliability which is relevant for inter-cluster comparisons. This reliability should be used in the model for estimating true mean score of a cluster or class.

The purpose of this paper is to study the problem of estimation of aforesaid reliabilities and of the true score in these situations.

Following Srivastava and Webster (1967), the method of obtaining the least squares estimate of a person's true score from his observed score to be linear, has been employed in this paper. The regression coefficients so obtained are also interpretable as the reliability of the test defined as the ratio of true score variance to observed score variance. The model used is essentially the second linear model employed by Srivastava and Webster (1967), with a slight change in the procedure of estimation of parameters.

Matrix Sampling, Assumptions and Notations

It is assumed that clusters of examinees are randomly selected from a large universe of clusters which may be schools, classes or some such groups, and the test is administered to all the members of the sampled clusters. The test itself consists of a finite number of items selected at random from a large pool of items. Following Lord (1955, 1959), the sampling of persons

(examinees) will be called 'Type 1 sampling' and that of items as 'Type 2 sampling'. Expected values over Type 1 sampling will be denoted by E_1 and those over Type 2 sampling by E_2 . E_{12} is used to denote the expected values over both types of sampling. Random sampling of items from a large pool implies that an infinitely large family of different composite tests exists which could be constructed by sampling of items in a specified manner. The given test (t) is one of that family. Let us use the following notations :

$k,$	The number of items (i) in a test (t). $i=1, 2, \dots k.$
$n,$	The number of clusters (c) selected at random from a large number of clusters, $c=1, 2, \dots n.$
$N,$	Number of individuals in each cluster (equal-size clusters are assumed for the sake of simplicity here, but the formulae have been generalized in the case of unequal clusters later).
$x_{pte},$	The observed score of pth person on cth item in cth cluster.
$x_{ptc} = \sum_1 x_{pte},$	The observed total score of pth person in cth cluster on the test.
$\bar{x}_{pc} = \frac{x_{ptc}}{k},$	The observed mean score of pth person in cth cluster on the test.
$\bar{x}_{tc} = \frac{\sum_p x_{ptc}}{N},$	The observed test mean score over persons in cth cluster.
$\bar{x}_{ic} = \frac{\sum_p x_{pte}}{N},$	The observed ith item mean score over persons in cth cluster.
$\bar{x}_t = \frac{\sum_c \bar{x}_{tc}}{n},$	The observed overall test mean score over persons and clusters.
$\bar{x}_i = \frac{\sum_c \bar{x}_{ic}}{n},$	The observed overall ith item mean score over persons and clusters.
$\bar{x}_{..c} = \frac{\sum_1 \bar{x}_{ic}}{k},$	
$M_{pc},$	The true score of pth person in cth cluster.
$M_{.c},$	The true mean score of cth cluster.
$M = E_1 [M_{p0}] = E_{12} [x_{pte}]$	

ESTIMATION OF TRUE SCORES AND RELIABILITY

- $\sigma^2_{pc} = E_2 [x_{pte} - M_{pc}]^2$, The variance of p th person's total observed score in c th cluster.
 $V(M_{pc}) = E_1 [M_{pc} - M]^2$, The variance of true scores over persons.
 $C_{pcp'c} = Cov_2 [x_{pte} x_{p'te}]$, Covariance between examinees score in the same cluster. .
 $C_{pcpc'} = Cov_2 [x_{pte}, x_{p'te'}]$, Covariance between examinees score in different clusters.
 $C_1 = E_1 [C_{pcp'c}]$ and $C_2 = E_1 [C_{pcpc'}]$

In the case of simple random sampling of $N' = nN$ persons, for which results are already known, the above notations assume simpler form as follows :

- x_{pi} , Observed score of p th person on i th item.
 x_{pt} , Observed score of p th person on the test.
 $\bar{x}_{pt} = \frac{\sum_i x_{pi}}{k}$ Mean observed score of p th person on the test.

Similarly, other notations can be written as under :

$$\bar{x}_{.t} = \frac{\sum_p x_{pt}}{nN} = \frac{\sum_p x_{pt}}{N'}$$

$$M_p = E_2 [x_{pt}], \quad M = E_{12} [x_{pt}] = E_1 [M_p]$$

$$M_1 = E_1 [x_{pt/i}], \quad M_1 = E_1 [x_{pt'i}] = \sum_i M_1$$

$$V(M_p) = E_1 [M_p - M]^2,$$

$$\sigma^2_p = E_2 [x_{pt} - M_p]^2, \quad \sigma^2 = E_1 [\sigma^2_p]$$

$$C_{pp'} = Cov_2 [x_{pt}, x_{p't}] = E_2 [x_{pt} - M_p] [x_{p't} - M_{p'}]$$

$$C = E_1 [C_{pp'}]$$

Basic Linear Model For the Estimation of True Scores in the Case of Random Sampling Model

The linear model,

$$M_p + \text{error term} = \bar{x}_{.t} + B (x_{pt} - \bar{x}_{.t}) \quad \dots (1)$$

is used to estimate the true score of an examinee from his observed score on the composite test. Using the method of least squares, we minimize

$$S = E_{12} [M_p - \bar{x}_{.t} - B (x_{pt} - \bar{x}_{.t})]^2$$

with respect to B , and get

$$B = \frac{E_{12} [(x_{pt} - \bar{x}_{.t}) (M_p - \bar{x}_{.t})]}{E_{12} [(x_{pt} - \bar{x}_{.t})]^2} \quad \dots (2)$$

As shown by Srivastava and Webster (1967), B in (2) can easily be

expressed as

$$B = \frac{V(M_p)}{V(M_p) + \sigma^2 - C} \quad \dots (3)$$

The above is also interpretable as reliability of the test being the ratio of true score variance $[V(M_p)]$ to observed score variance $[V(M_p) + \sigma^2 - C]$.

To get an estimate of B , we have to substitute in (3), the unbiased estimate of $V(M_p)$, σ^2 and C .

The unbiased estimate of σ^2 is

$$\hat{\sigma}^2 = \frac{1}{N'p} \sum_p \hat{\sigma}_p^2 = \frac{k}{N'(k-1)} \sum_p \sum_i (x_{pi} - \bar{x}_{p.})^2 \quad \dots (4)$$

and that of C is

$$\hat{C} = \frac{2k}{N'(N'-1)(k-1)} \sum_i \sum_{p < p'} [(x_{pi} - \bar{x}_{p.})(x_{p'i} - \bar{x}_{p'.})] \quad \dots (5)$$

To obtain the unbiased estimate of $V(M_p)$, let us write

$$x_{pi} = \frac{M}{k} + \frac{1}{k} (M_p - M) + \left(M_i - \frac{M}{k} \right) + e_{pi} \quad \dots (6)$$

where e_{pi} is the residual term, so that

$$x_{pi} = \sum_i x_{pi} = M + (M_p - M) + (M_i - M) + \sum_i e_{pi} \quad \dots (7)$$

The variance of x_{pi} over persons for fixed test (i) [Rajaratnam (1960)] can be written as

$$\sigma_{.i}^2 = V(M_p) + \sum_i V(e_{pi}) = V(M_p) + kV(e_{pi}/i) \quad \dots (8)$$

Denoting by (MSr) , the residual mean square in the two-way analysis of variance of person by item matrix, we find that

$$E_{12} (MSr) = V(e_{pi}/i) \quad \dots (9)$$

Hence

$$\hat{V}(e_{pi}/i) = (MSr) \quad \dots (10)$$

Now since the given test is randomly selected member of the family of tests, so

$$s_i^2 = \frac{1}{(N'-1)} \sum_p (x_{pi} - \bar{x}_{.i})^2$$

can be used as an estimate of $\sigma_{.i}^2$ and thus from (8) and (10)

$$\hat{V}(M_p) = s_i^2 - k (MSr) \quad \dots (11)$$

Noting that (MSr) can also be written as

$$(MSr) = \frac{1}{k(k-1)} (k \sum_i s_i^2 - s_i^2)$$

where

$$s_1^2 = \frac{1}{N-1} \sum_p (x_{p1} - \bar{x}_1)^2$$

When we use (4), (5) and (11) in (3) and on simplifying, we obtain the estimate of B as

$$\hat{B} = \frac{s_1^2 - \frac{1}{k-1} (k \sum_i s_{i1}^2 - s_1^2)}{s_1^2} = \frac{\hat{V}^2(M_p)}{s_1^2} \quad \dots (12)$$

\hat{B} in (12) being the ratio of the estimate of the true score variance to observed score variance is the reliability of the test. It is the same as KR (20) formula derived in the case of randomly parallel tests.

Using (12) in (1), the estimate of the true score of a person from his observed score will be

$$\hat{M}_p = \bar{x}_1 + \hat{B} (x_{p1} - \bar{x}_1) \quad \dots (13)$$

Further, when we assume cluster-sampling of persons, three types of the estimates of the true score variance and observed score variance arise and using them three types of reliabilities and corresponding estimates of true scores are obtained, which we discuss in the following sections.

Overall Estimates of True Score and Reliability Assuming Cluster-Sampling of Persons

In obtaining overall estimates of true score and reliability assuming cluster-sampling of persons, the definitions of the parameters $V(M_{po})$ and σ^2 remain ineffective. However, the covariances between test scores of p th and p' th examinee can be defined as follows :

Let us denote the covariance between test scores of p th and p' th examinee in c th cluster under 'Type 2 sampling' by

$C_{pp'c} = \text{Cov}_2[x_{pte}, x_{p'te}]$ and also the covariance between examinee in different cluster under 'Type 2 sampling' by $C_{pp'c} = \text{Cov}_2[x_{pte}, x_{p'te}]$

Again, assuming $C_1 = E_1 [C_{pp'c}]$ and $C_2 = E_1 [C_{pp'c}]$ and following Srivastava and Webster (1967) numerator in (2) can be expressed as

$$E_{12} [(x_{pte} - \bar{x}_t) (M_{po} - \bar{x}_t)] = \frac{nN-1}{nN} V(M_{po}) \quad \dots (14)$$

and the denominator in (2) can be written as

$$E_{12} (x_{pte} - \bar{x}_t)^2 = \frac{nN-1}{nN} \left[V(M_{po}) + \sigma^2 - \frac{N-1}{nN-1} C_1 - \frac{(n-1)N}{nN-1} C_2 \right] \quad \dots (15)$$

Thus, B in (2) in terms of these parameters becomes

$$B = \frac{V(M_{pe})}{V(M_{pe}) + \sigma^2 - \frac{N-1}{nN-1} C_1 - \frac{(n-1)N}{nN-1} C_2} \quad \dots (16)$$

For the estimation of overall test reliability, the estimates of the observed score and the item score variances with a cluster-sampling of persons can be written as

$$s_{to}^2 = \frac{1}{nN-1} \frac{\sum_c \sum_p (x_{pte} - \bar{x}_{.t})^2}{c \cdot p} = \frac{\sum_c \sum_p (x_{pte} - \bar{x}_{.te})^2 + N \sum_c (\bar{x}_{.te} - \bar{x}_{.t})^2}{nN-1} \quad \dots (17)$$

and

$$s_{to}^2 = \frac{1}{nN-1} \sum_c \sum_p (x_{pte} - \bar{x}_{.t})^2 \quad \dots (18)$$

The suffix 'o' stands for 'overall'. Although these estimates are slightly biased because the sample is not a simple random sample of persons, yet these are more useful in exactly calculating MS_x . However, unbiased estimates of the observed score and the item score variances, assuming cluster-sampling of persons, can be written as

$$s_t^2 = \frac{1}{n-1} \frac{\sum_c (\bar{x}_{.te} - \bar{x}_{.t})^2}{c} + \frac{\sum_c \sum_p (x_{pte} - \bar{x}_{.te})^2}{nN} \quad \dots (19)$$

and

$$s_t^2 = \frac{1}{n-1} \frac{\sum_c (\bar{x}_{.te} - \bar{x}_{.t})^2}{c} + \frac{\sum_c \sum_p (x_{pte} - \bar{x}_{.te})^2}{nN} \quad \dots (20)$$

But it can be seen that for a large-scale testing, i.e. for large n , estimates in (17) and (18) reduce to (19) and (20) respectively. So estimates in (17) and (18) are good approximations in our case.

Using (17) and (18) in (11), the estimates of overall true score variances may be written as

$$\hat{V}(M_{po}) = s_{to}^2 - \frac{1}{k-1} \sum_i (k s_{to}^2 - s_{to}^2) \quad \dots (21)$$

Again the estimate of σ_{po}^2 in this case is

$$\hat{\sigma}_{po}^2 = \frac{k}{k-1} \sum_i (x_{pio} - \bar{x}_{po})^2 = k s_{po}^2$$

where

$$s_{po}^2 = \frac{1}{k-1} \sum_i (x_{pio} - \bar{x}_{po})^2$$

and so

$$\hat{\sigma}_{po}^2 = \frac{1}{nN} \sum_c \sum_p \hat{\sigma}_{po}^2 = \frac{k}{nN} \sum_c \sum_p s_{po}^2 \quad \dots (22)$$

Now the estimate of $C_{p\bar{p}'c}$ is

$$\hat{C}_{p\bar{p}'c} = \frac{k}{k-1} \sum_i (x_{p1c} - \bar{x}_{pc}) (x_{p'1c} - \bar{x}_{p'c})$$

so that

$$\hat{C}_1 = \frac{2k}{nN(N-1)(k-1)} \sum_c \left[\sum_i (x_{p1c} - \bar{x}_{pc}) (x_{p'1c} - \bar{x}_{p'c}) \right] \quad \dots (23)$$

and similarly we can write

$$\hat{C}_2 = \frac{2k}{n(n-1)(k-1)} \sum_i \sum_{p\bar{p}'} (x_{.1c} - \bar{x}_{..c}) (x_{.1c'} - \bar{x}_{..c'}) \quad \dots (24)$$

Using (21), (22), (23) and (24) in (16), \hat{B} can be expressed as

$$\begin{aligned} \hat{B}_0 &= \frac{s_{10}^2 - \frac{1}{k-1} (k \sum_i s_{10i}^2 - s_{10}^2)}{s_{10}^2 - \frac{1}{k-1} (k \sum_i s_{10i}^2 - s_{10}^2) + \frac{k}{nN} \sum_c \sum_p s_{pc}^2 - \frac{N-1}{nN-1} \hat{C}_1 - \frac{N(n-1)}{nN-1} \hat{C}_2} \\ &= \frac{\hat{V}(M_{pc})}{s_{10}^2} \quad \dots (25) \end{aligned}$$

The reliability in (25) will be used in model (1) for estimating the true score of any person in the sample, i.e.

$$\hat{M}_{pc} = x.t. + \hat{B}_0 (x_{p1c} - x.t.) \quad \dots (26)$$

The standard error of measurement (SEM) in this case will be

$$(SEM)_0 = s_{10} \sqrt{1 - \hat{B}_0}$$

It can be seen easily that the reliability in (25) is the same as one can obtain in a test assuming random sampling of persons. However, in estimating this reliability we have used a slightly biased estimate of $V(M_{pc})$, but still it is a good approximation of an unbiased estimate in our case of large-scale testing.

Intra-Cluster Pooled Estimates of True Score and Reliability

With a cluster sample of persons we find that the unbiased pooled estimate of intra-cluster observed score variance is given by

$$s_{1w}^2 = \frac{1}{n(N-1)} \sum_c \sum_p (x_{p1c} - \bar{x}_{.1c})^2 \quad \dots (28)$$

Suffix 'w' being used for 'within cluster'. Using (11), the unbiased pooled estimate of intra-cluster true score variance may be written as

$$\hat{V}(M_{pc}) = s_{1w}^2 - \frac{1}{k-1} (k \sum_i s_{1wi}^2 - s_{1w}^2) \quad \dots (29)$$

where

$$s_{1w}^2 = \frac{1}{n(N-1)} \sum_c \sum_p (x_{p1c} - \bar{x}_{.1c})^2$$

Also, $\hat{\sigma}^2$ in this case can be written as

$$\hat{\sigma}^2 = \frac{1}{nN} \sum_c \sum_p s_{p0}^2 \quad \dots (30)$$

and \hat{C} will be

$$\hat{C} = \frac{2k}{nN(N-1)(k-1)} \sum_c [\sum_{i:p>p} (x_{p1c} - x_{p0}) (x_{p'1c} - x_{p'0})] \quad \dots (31)$$

Using estimates in (28), (29), (30) and (31) in (3), we have

$$\hat{B}_w = \frac{\hat{V}(M_{p0})}{s_{1w}^2} \quad \dots (32)$$

Reliability obtained in (32) will be used in model (1) for estimating an individual's true score within a class or cluster, i.e.

$$\hat{M}_{p0} = \bar{x}_{.t.} + \hat{B}_w (x_{p1c} - \bar{x}_{.t.}) \quad \dots (33)$$

The SEM in this case will be

$$(SEM)_w = s_{1w} \sqrt{1 - \hat{B}_w} \quad \dots (34)$$

Inter-Cluster Estimates of True Score and Reliability

With a cluster sample of persons we can calculate an unbiased estimate of inter-cluster mean score variance as

$$s_{tb}^2 = \frac{1}{n-1} \sum_c (\bar{x}_{.t0} - \bar{x}_{.t.})^2 \quad \dots (35)$$

Suffix 'b' being used for 'between cluster' and the unbiased estimate of inter-cluster true mean score variance can be written as

$$\hat{V}(M_{.0}) = s_{tb}^2 \frac{1}{k-1} \sum_i s_{ib}^2 - s_{tb}^2 \quad \dots (36)$$

where

$$s_{ib}^2 = \frac{1}{n-1} \sum_c (\bar{x}_{.i0} - \bar{x}_{.i.})^2$$

Also, the estimate of σ^2 in this case will be

$$\hat{\sigma}^2 = \frac{1}{n} \sum_c \frac{k}{k-1} \sum_i (\bar{x}_{.i0} - \bar{x}_{.i.})^2 \quad \dots (37)$$

and that of C will be

$$\hat{C} = \frac{2k}{n(n-1)(k-1)} \sum_{i:c<c'} [\sum_c (\bar{x}_{.i0} - \bar{x}_{.i.}) (\bar{x}_{.i'0} - \bar{x}_{.i'.})] \quad \dots (38)$$

Using estimates in (35), (36), (37) and in (3), we have

$$\hat{B}_b = \frac{\hat{V}(M_c)}{s_{tb}^2} \quad \dots (39)$$

Reliability in (39) will be used in the model (1) for estimating the true mean score of any given class or cluster from observed cluster mean score i.e.,

$$\hat{M}_c = \bar{x}_{..} + \hat{B}_b (\bar{x}_{.c} - \bar{x}_{..}) \quad \dots (40)$$

The SEM in this case will be

$$(SEM)_b = s_{tb} \sqrt{1 - \hat{B}_b} \quad \dots (41)$$

Estimation of True Score and Reliability in Unequal Class or Cluster

Usually the naturally formed groups of units are taken as clusters and in such cases the cluster-size would, in general, vary from cluster to cluster. In our case also, the number of examinees (persons) in a class or cluster, will vary from cluster to cluster. In the case of unequal clusters, however, simple formulae for unbiased estimates of variances are not available and one has to use approximate estimates which are generally biased.

Overall Test Reliability and True Score Estimation

For simplicity, we assume intra-cluster variances and covariances between observed score of persons in the population to be constant and then the value of B in (16) can be written as

$$B = \frac{V(M_{pc})}{V(M_{pc}) + \sigma^2 - \frac{\bar{N}-1}{n\bar{N}-1} C_1 - \frac{(n-1)\bar{N}}{n\bar{N}-1} C_2} \quad \dots (42)$$

Where \bar{N} is the average number of persons in each cluster. Also let N_c be the number of persons in c th cluster, i.e., $p=1, 2, \dots, N_c$.

Now for the estimation of overall test reliability, the approximate estimates of observed score and item score variances will be

$$s_{to}^2 = \frac{1}{n\bar{N}-1} \sum_c \sum_p (x_{p1c} - \bar{x}_{.1.})^2 \quad \dots (43)$$

and

$$s_{io}^2 = \frac{1}{n\bar{N}-1} \sum_c \sum_p (x_{p1c} - \bar{x}_{.1.})^2 \quad \dots (44)$$

Using (43) and (44) in (11), the estimate of overall true score variance may be written as

$$\hat{V}(M_{po}) = s_{to}^2 - \frac{1}{k-1} (k \sum_i s_{to}^2 - s_{to}^2) \quad \dots (45)$$

Again, the estimate of σ^2 will be

$$\hat{\sigma}^2 = \frac{k}{nN} \sum_c \sum_p s_{po}^2 \quad \dots (46)$$

and approximate estimate of C_1 will be

$$\hat{C}_1 = \frac{2k}{nN(N-1)(k-1)} \sum_c \left[\sum_{i \in p} (x_{pio} - \bar{x}_{pc}) (x_{p'io} - \bar{x}_{p'a}) \right] \quad \dots (47)$$

and that of C_2 will be

$$\hat{C}_2 = \frac{2k}{n(n-1)(k-1)} \left[\sum_{c < c'} (\bar{x}_{.io} - \bar{x}_{..o}) (\bar{x}_{.ic'} - \bar{x}_{..o'}) \right] \quad \dots (48)$$

Using (45), (47), and (48) in (42), \hat{B} can be expressed as

$$\hat{B}_0 = \frac{\hat{V}(M_{po})}{\hat{V}(M_{po}) + \sigma^2 - \frac{N-1}{nN-1} \hat{C}_1 - \frac{(n-1)N}{nN-1} \hat{C}_2} \quad \dots (49)$$

Reliability in (49) will be used in model (1) for estimating the true score of any person in the sample, i.e.,

$$\hat{M}_{po} = \bar{x}_{.t.} + \hat{B}_0 (x_{pio} - \bar{x}_{.t.}) \quad \dots (50)$$

It can be seen that the reliability in (49) is a good approximation of test reliability in case the number of persons in different clusters do not vary much.

Intra-Cluster Estimation of Reliability and True Score

With a cluster sample of persons, the estimate of intra-cluster observed score and item score variances can be obtained exactly and we need not use approximations. These are as follows :

$$s_{1w}^2 = \frac{1}{n} \sum_c \frac{1}{N_c - 1} (x_{pte} - \bar{x}_{.te})^2 \quad \dots (51)$$

Where N_c is the number of persons in the c th cluster, and similarly,

$$s_{1w}^2 = \frac{1}{n} \sum_c \frac{1}{N_c - 1} \sum_p (x_{pio} - \bar{x}_{.ic})^2 \quad \dots (52)$$

Thus,

$$\hat{V}(M_{po}) = s_{tw}^2 - \frac{1}{k-1} (k \sum_i s_{1w}^2 - s_{tw}^2) \quad \dots (53)$$

Also, $\hat{\sigma}^2$ in this case will be

$$\hat{\sigma}^2 = \frac{k}{n} \sum_c \frac{1}{N_c} \sum_p s_{po}^2 \quad \dots (54)$$

and the estimate of C will be

$$\hat{C} = \frac{2k}{n(k-1)} \sum_c \frac{1}{N_c(N_c-1)} \left[\sum_{p < p'} (x_{pte} - x_{pe}) (x_{p'te} - x_{p'e}) \right] \quad \dots (55)$$

Using estimates in (51), (53), (54) and (55) in (3), we have

$$\hat{B}_w = \frac{\hat{V}(M_{pe})}{S_{tw}^2} \quad \dots (56)$$

Reliability obtained in (56) can now be used in the model (1) for estimating an individual's true score with in a class or cluster, i. e.

$$\hat{M}_{pe} = x_{t.e} + \hat{B}_w (x_{pte} - x_{t.e}) \quad \dots (57)$$

Inter-Cluster Estimates of True Cluster Mean Score and Reliability

With varying size of cluster, it can be easily seen that the estimates of inter-cluster reliability and true mean cluster score can be obtained by using (39) and (40). However, it is obvious that these estimates are not unbiased.

Intra-Class Correlation and Reliability

In cluster-sampling of persons the intra-cluster correlation between total scores of examinees, say ρ , measures the homogeneity of the examinees within cluster. It is easily seen that the reliabilities in (25), (32), and (39) vary greatly with a change in the value of ρ . Usually with schools as clusters, ρ is generally positive as the intra-cluster variations are less than inter-cluster variations. In such a situation, the intra-cluster reliability tends to be less and inter-cluster reliability tends to be more, compared to the overall reliability. For a negative ρ , intra-cluster reliability will be more and inter-cluster reliability will be less. When ρ tends to zero, the overall, the intra-cluster and the inter-cluster reliabilities all tend to be equal.

CONCLUSION

It has been observed that a change in the sampling scheme of items in a test results in a substantial change in the reliability of a test. It is of interest to see how a change in the sampling scheme of persons affects the test reliability. In large-scale testing, when the sampling of persons is usually cluster sample, the overall reliability of the test remains the same as that obtained in the case of random sampling of persons. However, intra-cluster and inter-cluster reliabilities have different interpretations and serve different purposes.

Table

c	i/p											overall
	1	2	3	4	5	6	7	8	X_{pic}	\hat{M}_{pc} within	\hat{M}_c between	
First Cluster	1	4	2	4	7	6	8	7	44	41.58		42.37
	2	3	3	6	7	7	7	9	46	43.02		43.98
	3	4	3	5	8	6	7	8	47	43.74		44.79
	4	5	3	3	2	4	5	7	34	34.38		36.41
	\bar{x}_{i_1}	16	11	18	21	23	27	31	171			
	\bar{x}_{i_1}	4.00	2.75	4.50	5.25	6.00	5.75	6.75	42.75		42.38	
	$\sum_p (\bar{x}_{pi} - \bar{x}_{i_1})^2$	2.00	0.75	5.00	2.75	22.00	4.75	2.75	106.75			
Second Cluster	1	1	2	2	1	3	4	5	6	27.18		26.17
	2	1	0	2	2	4	4	7	8	27.18		26.17
	3	3	2	5	4	7	4	5	6	35.82		35.88
	4	3	1	5	6	4	5	4	5	33.66		33.45
	\bar{x}_{i_2}	8	5	14	11	16	17	21	25	117		
	\bar{x}_{i_2}	2.00	1.25	3.50	2.75	4.00	4.25	5.25	6.25	29.25	29.55	
	$\sum_p (\bar{x}_{pi} - \bar{x}_{i_2})^2$	4.00	2.75	9.00	22.75	14.00	0.75	4.75	4.75	114.75		

Third Cluster

1	2	3	2	3	4	3	4	3	6	5	28	30.06	29.40
2	1	3	3	3	5	2	5	5	4	7	30	31.50	31.02
3	3	4	4	4	6	1	6	6	5	7	36	35.82	35.88
4	3	2	4	4	8	4	8	5	7	9	42	40.14	40.74
\bar{x}_{i3}	9	12	13	13	23	10	23	19	22	28	136		
\bar{x}_{i3}	2.25	3.00	3.25	3.25	5.75	2.50	5.75	4.75	5.50	7.00	34.00		34.07
$\sum_p \left(\frac{x_p - \bar{x}_{i3}}{p_{i3}} \right)^2$	2.75	2.00	2.75	2.75	8.75	5.00	8.75	4.75	5.00	8.00	120.00		
\bar{x}_{i1}	33	28	45	42	63	42	63	59	70	84	424		
\bar{x}_{i1}	2.75	2.33	3.75	3.50	5.25	3.50	5.25	4.92	5.83	7.00	35.33		
$\sum_c \sum_p \left(\frac{x_{pc} - \bar{x}_{i1}}{p_{ic}} \right)^2$	18.25	12.67	20.26	49.00	54.26	14.93	19.68	20.02	716.67				
$\sum_c \left(\frac{x_{ic} - \bar{x}_{i1}}{c_{i1}} \right)^2$	2.38	1.79	0.88	4.63	2.38	1.17	1.29	1.13	93.79				

Intra-cluster reliability is relevant when the true score of a person within a cluster has to be estimated and the same should be used in SEM for comparing the within cluster scores of any two persons.

Again, if the average score of two clusters have to be compared then inter-cluster reliability is appropriate to use in SEM. For comparing scores of two persons from different clusters, the overall reliability of the test should be used in SEM.

Since the intra-class correlation between total scores of examinees is usually positive we expect the intra-class reliability to be less and inter-cluster reliability to be more, compared to the overall test reliability.

NUMERICAL EXAMPLE

The calculations for the estimation of reliability and true scores in the corresponding situation in the case of cluster sampling of persons in a test are shown in the Table. Here we have used an eight-item test administered to three clusters of examinees (each consisting of four examinees) randomly selected from a large number of such clusters. Thus $k=8$, $n=3$, and $N=4$. The raw scores range from 0 to 9 (hypothetical data).

- i) Overall estimation of reliability and true scores : Using (19) and (23) in (27), we have

$$B_o = \frac{\bar{A}}{65.20} = 0.81$$

Now using (28), estimation of true scores of persons in the case of cluster sampling is shown in the Table. Also on using (29),
 $(SEM)_o = \sqrt{65.20(1-0.81)} = 3.52$.

- ii) Intra-cluster estimation of reliability and true scores : Using (30) and (31) in (34),

$$B_w = \frac{\bar{A}}{34.61} = 0.72$$

Now using (35), intra-cluster estimation of person's true score is shown in the Table.

On using (36),

$$(SEM)_w = \sqrt{34.61(1-0.72)} = 3.11$$

- iii) Inter-cluster estimation of true scores and reliability :

Using (37) and (38) in (41),

$$B_b = \frac{\bar{A}}{46.90} = 0.95$$

Now using (42), estimation of cluster true mean score is shown in the Table.

On using (43),

ESTIMATION OF TRUE SCORES AND RELIABILITY

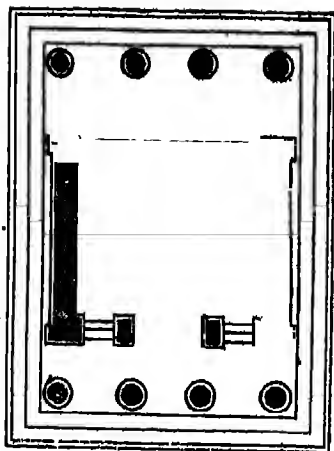
$$(SEM)_b = \sqrt{46.90 (1-0.95)} = 1.53$$

Clearly $\hat{B}_w < \hat{B}_o < \hat{B}_n$

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An Analysis of Certain Dimensions of Creativity

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INTRODUCTION

AFTER THE Second World War, Thurstone, Taylor, Guilford and their associates have been the pioneers in the U.S.A. in stimulating research in the field of creativity. At the national level, three national conferences held at the University of Utah with financial support from the National Science Foundation in 1955, 1957 and 1959 may be regarded as the precursor to further researches in this field. Soon this massive movement influenced the educators so much that by 1960 education for creativity became the most important goal throughout America. Since then, much research work has been done there in this field. The impact of all the labour and cost involved in this kind of exploration has begun yielding fruitful dividends and new education is being fashioned after the relevant findings of the research. Nevertheless, much institutional researches are still being conducted in this hitherto elusive field.

In a developing country like India there is an urgent need of taking up research in creativity. But no researches of comparable dimensions have been taken up at the institutional level in India. Some sporadic individual researches have, however, been done in recent years and some others are continuing now in some universities of our country on certain limited aspects of creativity. The harbinger of this disposition was perhaps the doctoral dissertation of Manas Ray-Chaudhuri.¹

¹Thesis submitted to the M.S. University of Baroda (1975).

²The publication of abstracts of Ph.D. Theses is financed by the Indian Council for Social Science Research, New Delhi.

³An investigation into the personality structure of musicians, Calcutta University, 1962.

METHODOLOGY AND POSTULATES

In that last decade educationists and researchers in India have also evinced interest in creativity. A large bulk of the published literature, however, deals with theoretical formulations. On the empirical side, the studies are all done by the R-technique. In terms of age-levels, most studies seem to be confined to children and adolescents. For example, Raina (1968) has studied cognition, personality and socio-economic correlates of creativity, involving 175 pupils of Classes VIII, IX and X of Rajasthan as his subjects. The instruments used by him were the Hindi versions of the BPRS, Taylor's Manifest Anxiety Scale, the Jalota Test of Mental Ability, the Kuppuswami Socio-economic Status Scale and the Minnesota Test of Creative Thinking. Raina has conducted a number of other studies, many of them are related to the above one. Passi (1971) has conducted an exploratory correlational study of creativity as related to achievement and intelligence, involving students of the higher secondary stage of Punjab. The creativity instrument employed by him was the one constructed by himself. Paramesh (1969)'s study was concerned with finding the relationship of creativity with extraversion, emotionality, body-image and values. Sarkar is pursuing a study of personality of creative and intelligent children at Viswa Bharati University, Shantiniketan. Many of the recently completed or ongoing research activities in creativity are knowledgeably either of the nature of test-construction or they are correlational studies using the R-technique.

The present study concentrated upon certain personality dimensions of creative adults of India. For the fear that creative individuals might feel weary of taking long and rigorous tests which are generally employed in the R-methodology, the Q-technique was selected for obviating that difficulty.

For the purpose of present investigation the operational definition of creativity was : Creativity may be defined as the manifestation of uncommon talent in terms of novel and original products (whether ideas or effects) commanding high professional estimate of their worth.

Postulates

1. Every creative field has its own characteristic dimension-pattern.
2. In general, creative persons are introverts.
3. Specifically speaking, the creative persons (i) are curious to know new things; (ii) are more feeling and intuitive type; (iii) are aesthetic in taste; (iv) believe in supernatural powers; (v) have feeling of superiority; (vi) have mysterious experiences; (vii) are irritable.

4. Creative persons of the verbal category are distinguishable from those of the non-verbal category in respect of patterns of personality characteristics.

5. Creative persons of the verbal category have similar personality patterns among themselves.

6. Creative persons of the non-verbal category have similar personality patterns among themselves.

The Method of Study

The Q-methodology was selected for this study, a justification for which has been given in thesis. Moreover, no study of creativity employing the Q-technique appears to have been conducted in India as yet.

The Tools and the Sample

As the Q-technique was selected for the present investigation it was considered proper to test Jung's typology vis-a-vis creativity. Hence the block design adumbrated by Stephenson was adopted.

Procedure of the Experiment

The selected creative persons (called the operators) were given the pack of 80 cards containing the statements. They were requested to shuffle the cards thoroughly and then to read all the statements one by one. They were asked first to sort and pile them into three decks according to these three categories : (a) those which are definitely positively applicable to oneself ; (b) those which are not so applicable to oneself; and (c) those in-between. Doubtful cards or those which were half-way true were also put in the middle pile. Then they were asked to distribute the cards into eleven piles (Q-sorts) according to the significance of each statement to one's own self from his internal frame of reference.

The Magnitude of the Field Work

(a) TESTING TIME : An attempt was made to estimate the approximate time devoted for administration of the Q-test. It was observed that the time spent with the Ss for the purpose ranged from 1 hour 5 minutes to 3 hours 20 minutes. A few Ss required two sittings—one for formalities and the next one for the actual Q-sort operation. Majority of the Ss took around 1 hour 10 minutes for operating the cards and another 10-20

minutes for filling the data card and answering questions given therein. Total time spent in contact with the Ss comes to about 100 hours approximately. Testing started in March 1972 and terminated in May 1973.

(b) **TEST SPACE** : The testing involved nearly 5000 kms. of travel. Some places had to be visited twice or thrice depending upon the appointment available with the Ss for this work.

Test-retest Reliability

Coefficients of Stability (r_{tt}) and Indices of Reliability (r_{100}) were computed for 9 college teachers and research scholars, and the r_{tt} values ranged from 0.59 to 0.86 and the r_{100} values ranged from 0.77 to 0.92. The interval range between test and retest sessions was from 12 to 63 days with an average of 50 days. The Q-cards were finalized on the basis of these satisfactory reliability values.

Analysis and Interpretation of Data

Data collected from 38 highly creative persons was subjected to cluster analysis and also to factor analysis by the centroid method. On various considerations it was decided to retain four factors for further analysis. Factor-arrays for each factor were calculated by the method indicated by Stephenson (1953).

Identification of the Factors and their Description

A close look at the most characteristic statements for each factor, i.e. the top three or four categories of each factor-array suggests the identification and description of the factors. A look at the bottom three or four categories is helpful in proper identification of each factor. Following this rule the identification and description of each of the four factors arrived at are given in the following paragraphs.

The First Factor

This factor represents characteristic description of all the creative persons studied with the exception of one. The following factor-description emerges : Rational optimism, high ego-strength, realistic and healthy attitude towards life (emotional stability), openness to experience, dedicated persistence, sense of worth, assertive self-confidence and tendency for self-

actualization. This description comes close to stable and venturesome (parmia) personality factors described in the personality theory of Cattell. This factor is unipolar, all values being positive. At the least characteristic (negative) end are statements describing neurotic characteristics which confirms the proposition that those persons are emotionally stable and they have healthy attitude towards life, possessing adequate sense of self-worth.

The Second Factor

Unlike the first factor, this factor is bipolar in nature. Ten persons represent the positive side while nine persons represent the negative side of this factor. The positive factor-description emerges as follows : Religious dedication, religious mystical, fatalistic, faith in supernatural power and self-abnegation. This part is comparable with Cattell's 'maginative' (autia) factor.

The negative array of this factor may be described as : Practical, non-religious, outspoken, self-confident (faith in self as opposed to faith in supernatural power). This part compares well with Cattell's 'practical' (praxernia) factor.

The Third Factor

Like the second factor, this factor is also bipolar. Seven persons represent the positive end while an equal number of persons represent the negative end of this factor. The following positive factor-description seems apparent : Mystical-intuitive guided by the unconscious inner-self. This characterizes introvert feeling type of personality.

The negative end seems to characterize the following attributes : Non-mystical, industrious, exerting, extravert-thinking type.

The Fourth Factor

Again, like the second and the third factors, the fourth factor is also bipolar. Five creative persons represent the positive end of the factor while three persons represent its negative end. The positive end of the factor may be described by the following characteristics : Urge for self-expression, openness to experience or extensionality (Rogers' description), flexible value-orientation. The tendency is introvertive intuitive. This may be compared with Cattell's 'self-sufficiency' factor.

CERTAIN DIMENSIONS OF CREATIVITY

Likewise, the negative array may be interpreted as composed of the following attributes : Fixed value-orientation, methodical, social, extravert sensational type. This may be compared with Cattell's Group-tied (group-adherence) factor.

The statements made by the creative persons relating to their guiding philosophies seem to substantiate the above descriptions.

INFERENCES

Postulate 1

Every creative field has its own characteristic dimension-pattern.

Finding : This proposition is not borne out in this investigation. No factor describes a pure area like fine arts, science, literature or performing art. This finding agrees with the finding of the famous Berkeley studies that "there is no clear stereotype of the creative individual," (Vervalin, 1962) even though Factor I which is descriptive of an ambivert phenomenon is perhaps the stereotype of the creative individual which emerges in this study.

Postulate 2

In general, creative persons are introvert.

Finding : This proposition is not substantiated in this investigation. Factor I, which has most of the common variance, suggests ambivert characteristic. We find both extroverts and introverts amongst the creative persons as reflected in the bipolar Factors II, III and IV extracted in this study.

Postulate 3

Specifically speaking, the creative persons (i) are curious to know new things; (ii) are more feeling and intuitive type; (iii) are aesthetic in taste; (iv) believe in supernatural powers; (v) have feeling of superiority; (vi) have mysterious experiences; (vii) are irritable.

Findings : Proposition 3 (i) is amply substantiated as openness to experience and curiosity to acquire new experiences is characteristic of almost all of the creative persons included in this study.

Proposition 3 (ii) is partly supported and it holds good for a significant number of the creative persons.

Proposition 3 (iii) as revealed from the positions of statement numbers 55 and 69 in the four factor-arrays is sufficiently established.

Proposition 3 (iv) is very much substantiated in respect of persons having high Factor II loading. In others it is not so very evident.

Proposition 3 (v) is not substantiated generally. However, from the position of statement numbers 5, 34, 60 and 63 in the sorts of a few of them, it is revealed that they have high self-esteem.

Proposition 3 (vi) does not hold good generally but it is evident in case of creative persons having high loadings in Factors II and III although the sources of mysterious experiences are different: they might be supernatural inspiration in one case while in the other they may be traceable in the debris of the unconscious.

Proposition 3 (vii) could not be ascertained by the Q-sort cards except perhaps by the position of statement No. 18 in the factor-arrays or in the individual Q-sorts. It is revealed that creative persons are generally very polite and mild-mannered persons. In a couple of cases, and that too in the initial stage of contact, this investigator found from his personal experience their propensity to be somewhat irritable because of preoccupation with their own work. Subsequently, however, even those seemingly exceptions proved to be very polite, cooperating and good-natured persons after the initial resistance.

Postulate 4

Creative persons of the verbal category are distinguishable from those of the non-verbal category in respect of personality characteristics.

Finding: This proposition was not supported by this factor-analytic study.

Postulate 5

Creative persons of the verbal category have similar personality patterns amongst themselves.

Finding: This proposition was also not supported from the factor-analytic study of the self-psychologies of the creative persons. A blend of various factors appears in all of them in differing proportions and with remarkable inconsistency-regardless of the area of creative pursuit.

Postulate 6

Creative persons of the non-verbal category have similar personality patterns among themselves.

Finding: Inference drawn in respect of Postulate 5 is applicable in respect of this postulate also. □

Preparing State Norms for the Delta Class in Hindi, History and Geography

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INTRODUCTION

IN THIS AGE of science we observe tremendous development in every field of life. Science and technology are the key factors for industrial development. They are responsible for most of the changes in social, economic and educational set-up of the world today. With rapid social changes today, education is being given top priority by the government.

The present system of examination in India has many drawbacks in addition to not being an uniform or accurate system of evaluation. Different measures to improve the present examination system have been suggested by various bodies and commissions, some of them have been implemented, but the question of educational process still remains to be touched. With the introduction of new pattern of education in the Gujarat State the syllabus has undergone a change. The objectives for various subjects are formulated with a new perspective. In this context it is worthwhile attempting to standardize the achievement tests and even to fix up the norms for different subjects. In Gujarat, the delta class (Class VII) represents the topmost or terminal class of primary schools.

The Education Commission (1964-66) clearly emphasizes the need for standardized tests or battery of achievement tests for various subjects, at the end of primary stage in India. Thus, motivated by explicit need, the investigator undertook this problem.

OBJECTIVES

The study has been undertaken with the following objectives :

- (1) To prepare achievement tests in Hindi, history and geography for the delta class (Class VII).

*Thesis submitted to Bombay University (1977).

- (ii) To standardize the achievement tests in Hindi, history and geography prepared for the delta class.
- (iii) To determine state norms for pupils on the basis of newly prepared tests of Hindi, history and geography for the delta class.
- (iv) To study inter-group achievement in the subjects, viz. Hindi, history and geography for the delta class.
- (v) To provide schools with the reliable and valid tool for measuring achievement in Hindi, history and geography for the pupils of the delta class.

SCOPE AND LIMITATIONS

The study has been limited to only delta class of Gujarat and has been restricted to a sample of 12,000 pupils drawn from various schools of Gujarat. Applying the geographical concept of delta to stages of education, it can be said that more bifurcations take place at the end of Class VII, and hence, this class has been considered as delta class. The pupils studying in the elementary schools and pupils studying in elementary classes with the secondary schools represent two district populations. As both the streams differ in many respects, such as staffing pattern, teaching methods, performance of the pupils, etc. the researcher has selected the elementary classes attached to the secondary schools as the delta class.

THE CONCEPT OF MEASUREMENT

A review of the past works highlights the fact that measurement in education has drawn the attention of Indian educationists after Bloom's visit to India in 1956-57. Gujarat is passing through rapid and crucial changes in its educational system. As a first step, the Government of Gujarat has nationalized textbooks. This government has also adopted changes in the examination system. The schools have now-a-days included objective tests in their question papers. This has helped the objective-based instruction in the classroom. All these changes need standardized achievement tests to compare the achievement of pupils.

PROCEDURE

The blueprint is the first stage in the construction of a test. The objectives to be measured were clearly defined and formulated. The weightage to be assigned to the objectives and different content areas of the syllabus were also determined. With the help of job analysis charts final

blueprints for all the tests were prepared.

Keeping in view the objectives and teaching points the following test items were framed : (i) Multiple choice type; (ii) True-false type; (iii) Fill-in-the-blank type, and (iv) Matching type.

The pre-pilot tests were administered to 10 pupils randomly selected from urban and rural areas. After scoring the tests, item-analysis was carried out and the difficulty values and the discriminating indices were calculated with the help of the usual standard procedures.

Each of these tests was administered to a sample of 400 pupils, covering boys and girls of urban and rural areas. Each of these tests was also administered to over 100 pupils to find out the time allowance to be given for answering the items. It was calculated and fixed to 70 minutes for each test, by using a standard process. Then each of the final test was administered to a sample of 100 pupils to establish reliability and validity. The reliability coefficient of the test was studied by different methods.

The concurrent validity of each of the test was studied by using teacher's opinion as an external criterion. The validity coefficients of the tests are given below :

1. Hindi	+	0.874	±	.024	P.E.
2. History	+	0.644	±	.059	P.E.
3. Geography	+	0.767	±	.041	P.E.

The validity of the different tests scores was studied by correlation scores on the tests with annual examination marks. The coefficients of correlation are given below :

1. Hindi	+	0.722	±	.048	P.E.
2. History	+	0.819	±	.033	P.E.
3. Geography	+	0.816	±	.033	P.E.

The final tests were administered to 11, 952 pupils of 88 schools selected through stratified random sampling from urban and rural areas covering 19 districts of Gujarat. The scores were entered in data-entering cards, and the sex and area norms were established for different groups. The norms thus prepared are given in terms of percentiles scores and Z-scores. Normalities of distribution of achievement scores obtained by pupils in three subjects were checked by using chi-square technique, skewness and kurtosis. This all led to conclude that the obtained distributions were normal.

The area-norms, age-norms, sex-norms and grade-norms are prepared

in terms of percentiles and Z-scores for the achievement in different subjects chosen for the study.

FINDINGS

Generally pupils achieve only 50 per cent of scores or even less, hence, it can be said that the pupils are unable to manage for higher scores. In the informative subjects like history and geography, they get less than 50 per cent marks.

From the results of the chi-square technique applied to the sample selected in the final run of the three tests, it has been found that the distribution of achievements in the subjects under study are normal. The skewness obtained for the subjects Hindi and geography is negative and not significant at .01 level, while in history it is positive and its values are highly significant.

For Hindi the mean difference between the scores of urban boys and urban girls is not significant, while between the rural boys and rural girls it is significant at all levels. In case of history the difference between the mean scores of urban boys and urban girls is significant at .01 level while in case of rural boys and girls it is not significant.

In the subject of geography the difference in the mean scores of urban boys and girls, and rural boys and girls are significant at .01 level.

CONCLUSIONS

Hindi : The urban boys and girls are by and large equal with respect to the achievement in Hindi. Urban pupils (boys and girls) are found superior in achievement in Hindi to rural pupils (boys and girls). It is interesting to note that the girls of rural area showed significantly better performance than those of boys.

History : The urban girls are superior to the urban boys. Urban boys have performed better than the rural boys. Urban girls have performed better than the rural girls. Rural girls and the rural boys do not differ in their achievements. The pupils of urban area are high achievers than the pupils of the rural area. In rural area the girls are superior to the boys.

Geography : The urban girls have performed better than the urban boys. Urban boys are superior to the rural boys. Urban girls have performed better than the rural girls. The rural girls are better in achievement scores than the rural boys. It shows that the pupils of urban area score more than the pupils of the rural area. Among the rural pupils, the girls are superior to the boys.

□

The Psychological Make-up and Sociological Background of Creative and Non-Creative Student-Teachers

An Investigation

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{The Problem

DESPITE NUMEROUS doubts and criticisms raised against its various aspects, creativity has continued to capture the interest of researchers in the fields of education and psychology during the past two-and-a-half decades. Although considerable work to understand the phenomenon of creativity has been done in the United States, relatively little effort has been made to explore this phenomenon in our country. Indian studies in the field of creativity are not only limited in number but they also seem to be confined to only a few areas ignoring others.

Teacher creativity is one such area. It is, indeed, a sad commentary on our part that while education has been recognized as an effective instrument of social change and modernization and while teachers by virtue of their position in the social system are expected to play a vital role in this process, very little attention has so far been paid to understand the creative teachers. No doubt, some investigators have attempted to study creativity among teachers, very few, if any, have studied the variables of the present study—particularly the sociological ones—and perhaps none of them has employed a transactional approach.

Purpose

The purpose of this study was to identify two groups of student-teachers.

*Thesis submitted to Lucknow University (1977).

—one exhibiting high creative potentiality (termed as creative student-teachers) and the other exhibiting low creative potentiality (termed as non-creative student-teachers)—and compare the two groups in terms of the following psychosociological variables : values, personality adjustment, teacher attitude, family background, age, sex, residence (rural-urban), marital status, religion and caste.

Hypotheses

Corresponding to each of the above variables a separate hypothesis was formulated for empirical verification as follows :

- (i) Creative student-teachers are significantly higher than the non-creatives on mean scores for theoretical, aesthetic and economic values.
- (ii) Creative student-teachers are significantly higher than the non-creatives on mean scores for the different dimensions of personality adjustment.
- (iii) Creative student-teachers are significantly higher than the non-creatives on mean score for teacher attitude.
- (iv) There is a significant difference between the two groups of creative and non-creative student-teachers regarding their family background.
- (v) There is no significant difference between the two groups regarding their age.
- (vi) There is no significant difference between the two groups regarding sex.
- (vii) The two groups differ significantly from each other regarding their residential background.
- (viii) The two groups do not differ significantly from each other in respect of marital status.
- (ix) The two groups do not differ significantly from each other in respect of religion.
- (x) The two groups do not differ significantly from each other in respect of caste.

The Sample

The sample for this study consisted of two groups of student-teachers selected from the entire population of B.Ed. students in the city of Lucknow during the academic session 1974-75. There were six institutions

running B.Ed. classes during this session with a total enrolment of 522. Out of these, only 442 could be contacted to administer the Torrance Tests of Creative Thinking (TTCT- both verbal and figural forms) as others were not attending their classes due to different reasons. From these 442, the two groups were drawn on the basis of total creativity scores obtained by each subject as follows :

1. *The creative group* : These were the subjects in the top 20 per cent on creativity measures (N=89).
2. *The non-creative group* : These were the subjects in the bottom 20 per cent on creativity measures (N=89).

Tools

Besides TTCT, other instruments used in this study for data collection, included Ojha Study of Values (an Indian adaptation of Allport-Vernon-Lindzey Study of Values), California Test of Personality (CTP), Minnesota Teacher Attitude Inventory (MTAI) and the Information Form devised by the investigator for collecting data about sociological background of the subjects.

Treatment of Data

The statistical techniques employed in connection with the hypothesis testing were *t*-test (for psychological data) and the chi-square (for sociological data). The level of significance (.05) was chosen as the cut-off point for accepting or rejecting a hypothesis.

Results

The analysis of the data for value orientation showed that out of the six values measured by Ojha study of values only two—economic and theoretical—differentiated between the two groups significantly. On economic value the creative group was found higher than the non-creative group as hypothesized; but on theoretical value the latter group surpassed the former which was contrary to the expectation of the investigator. Thus Hypothesis (1) could be supported only partially.

The data about personality adjustment revealed that the two groups differed significantly from each other on two out of the 15 sub-scales of the CTP. These were 'sense of personal freedom' and 'social standards' sub-scales. On both these the creative group was found to be higher than the

non-creative as postulated. On other sub-scales, although the creative group surpassed the non-creative, the differences between the two groups did not reach a statistically significant level. As such, Hypothesis (ii) received only partial confirmation.

The analysis of the scores for MTAI showed that although the creative group scored higher than the non-creative, the difference between the means of the two groups was not statistically significant (t -ratio 1.28). As such, Hypothesis (iii) was rejected.

Regarding family background of the two groups it was observed that on all the three counts of this variable examined in this study, namely, education, occupation and income of the father, the creative group was significantly higher than the non-creative. Thus, Hypothesis (iv) was retained.

The data for age, which were analysed in three ways using both chi-square and the t -test, indicated that although the creative group tended to be younger than the non-creative, the value of the chi-square and the t did not reach the level of statistical significance except on one occasion where the chi-square was found to be significant at .05 level. As such, no decision could be taken on Hypothesis (v) and further research into this aspect is suggested.

About sex composition of the two groups it was found that the creative group had a greater proportion of women than the non-creative. However, the difference between the two groups was not statistically significant. Thus, Hypothesis (vi) was accepted.

The analysis of the data regarding residential background of the two groups indicated that the creative group tended to have more subjects from urban and less from rural areas as compared with the non-creative group. The value of chi-square in this analysis came out to be significant at .05 level. When the analysis was done for the duration of city life, it was observed that the subjects with longer duration of city life generally fell in the creative group while those with shorter duration of urban life generally belonged to the non-creative group. The value of chi-square in this analysis was significant at .01 level. These results confirmed Hypothesis (vii).

The data about marital status, which were dichotomized into 'married' and 'unmarried' subjects, revealed that although the creative group possessed a somewhat greater number of unmarried and smaller number of married subjects as compared with the non-creative group, the difference between the two groups was not statistically significant. When the data regarding number of children with the married subjects in the two groups were analysed, again the results indicated lack of a significant difference between these groups. As such, Hypothesis (viii) was accepted.

Regarding religious composition of the two groups it was observed that in spite of some differences in the frequencies of the two groups for the various religious communities, these groups did not prove to be significantly different from one another. Therefore, Hypothesis (ix) was retained.

Finally, the data about caste composition of the two groups revealed that these groups had almost equal number of subjects from the different castes indicating thereby that the factor of caste had nothing to do with the creativity of student-teachers included in this study. The value of chi-square failed to reach a level of statistical significance. In the light of these results Hypothesis (x) was accepted.

Thus, the findings of this study indicate that high creativity among student-teachers tends to go with high economic value, better personality adjustment, better family background and urban living. Low creativity, on the other hand, seems to be associated with higher theoretical value, poor adjustment, poor family background and rural living. Teacher attitude, sex, marital status, religion and caste do not seem to have significant differential effects upon high and low creativity among student-teachers.

Conclusion

In the end it must be made clear that since the findings of this study are based on overall pictures of the creative and non-creative groups, they must be viewed with caution. Within each group there were to be found wide differences among subjects with regard to the different variables. Thus, for example, although the findings in this study indicated that high creativity tended to go with upper socio-economic background, it does not imply that all individuals from upper socio-economic groups would be creative and all from lower socio-economic brackets would be non-creative. Moreover, many of the group differences in the present study, although well marked, could not be found to be statistically significant. Indeed, what is required at the present stage of these findings is to undertake several independent follow-up studies of which some more important ones may be along the following lines.

1. Comparative study of value orientations of creative individuals from different cultural and professional groups.
2. Developmental trends in adult creativity with special reference to teachers.
3. Socio-cultural effects (e.g. rural, urban, tribal, slum) on creative behaviour.
4. Experimental studies on the development of creativity in teachers through different educational programmes and methods. ☐

Married Lady Teachers' Attitude towards Teaching Profession

KAILASH DEVI SUKHWAL

THE GENERAL HUNCH of the study is that women are by nature, psychologically better built for the teaching profession, or at least they are mentally more inclined towards this job. To test this, and particularly in the case of married lady teachers, the study aimed at developing an attitude scale to help selection of teachers on scientific basis. Another significant hunch related to the problems faced by these teachers is the inherent duality of a working woman's responsibilities. That is, her accepted role in the home and her expected duties in the profession tend to present a conflicting challenge to her which has to be met. How does this difficulty affect her attitudes towards her profession? What sort of problems does she face in the working world on account of this dual role? What are the propellant factors—the causes—which lead her towards this job in a willing or unwilling manner or, in other words, with a favourable or unfavourable disposition? These are some of the basic questions that the study proposed to answer.

Sampling and Delimitation

On the basis of random sampling, 500 married lady teachers working in 50 government girls' secondary schools from only five administrative divisions of Rajasthan, i.e. Ajmer, Bikaner, Jodhpur, Kotah and Udaipur were selected for the purpose of this study involving ten schools, both urban and rural in each division. Thus, 100 teachers from each division were selected.

Methods, Tools and Preparation of Scale

Normative survey method was used that most suited the study and a five-point attitude scale on Likert scale pattern was developed to assess the

*Thesis submitted to Udaipur University (1975).

attitudes of these teachers. Besides, an open-ended questionnaire was employed to explore (i) the causes of selection of the teaching profession by married lady teachers, and (ii) the problems of married lady teachers in actual work situation. The pilot or preliminary tryouts were made to give a valid and reliable footing to the attitude scale developed and used. The preliminary stage involved mailing of the questionnaire to 150 teachers, out of whom 110 responded including ten headmistresses. This gave a set of areas and problems for the development of the attitude inventory. The preliminary data thus made available was used to construct the Likert-type attitude scale and involved all the necessary steps of collection of some 180 statements, collecting opinions of judges, item analysis on first tryout of some 160 statements, second tryout of 130, final selection of 100 items for the scale. Judges' opinions, however, were related to the framing of instructions and to the final approval of the scale.

The Response

The test proformas or scales were sent to all the 500 teachers selected for the study. As response by mail was poor, most of the teachers were contacted personally to collect the data of the test. As a result 280 response sheets out of 500 could be received back, with 95 and 93 per cent responses from Ajmer and Udaipur division, respectively, while between 27 to 35 per cent from Kota, Jodhpur and Bikaner. However, only 240 fully completed forms could be selected for analysis.

Distribution of these 240 teachers by age-groups is 52 per cent between 31 to 40 years, 40 per cent between 21 to 30 while only 8 per cent above 40 years; by experience 42 per cent between 4 to 9 years, 28 per cent between 10 to 15 years, 16 per cent below 3 years, some 8 per cent above 16 years and only 5 per cent freshers; by academic qualifications 40 per cent postgraduates, 30 per cent graduates, 18 per cent higher secondary while 12 per cent high school passed; by professional qualifications 62 per cent B.Ed/B.T., 30 per cent S.T.C., 3 per cent M.Ed.; 3 per cent untrained and some 2 per cent under training. However, 37 per cent of them were postgraduates with B.Ed/B.T. and 25 per cent graduates with B.Ed/B.T.

Findings and Interpretations

The data were statistically interpreted to study the favourable and unfavourable attitudes of these teachers towards teaching and the problems faced by them. The significant findings are given below.

1. There is a clear difference in the professional attitudes of married lady teachers belonging to different age-groups—the higher the age the greater the favourable attitude towards teaching.
2. Experience tends to play an important part in developing favourable professional attitudes—the greater the experience, the greater the attitude. Some 15 years' experience on the job develops 10 per cent favourable attitude to the profession.
3. Though a large percentage of workers at all levels of their qualifications poses favourable attitude to teaching, teachers with high school qualifications reveal 100 per cent favourable attitude. While the trend is on the decrease of favourableness with increase in academic qualification from high school to graduation, a slight reversal is seen from graduation to postgraduation. However, professional training shows a positive effect on attitude to teaching.
4. Despite dual responsibilities at home and in the school, the married lady teachers are revealed to be fairly well-adjusted to both the work areas. However, in actual work situation unfavourable attitudes tend to predominate.
5. The study also reveals some 50 different reasons why married lady teachers select the teaching profession. [Abstract prepared by D.N. KHOSLA]



Serial Verbal Learning

Effects of Anxiety, Background Meaningfulness and Isolation

S. W. DESHPANDE

Introduction

PERSONALITY AND LEARNING theories constitute two important subjects of psychological studies. Researchers working on personality have made

use of learning principles. Some have also attempted to explain personality theories in terms of learning theories.

Factor analytic studies by Cattell and Scheier (1961) have resulted in two types of anxiety, i.e. trait anxiety and state anxiety. Most of the work done on anxiety carried out by psychologists is related with the testing of the implications of the Iowa theory. Many researchers thought of anxiety as a drive and, therefore, used animals for their researches. Taylor's Manifest Anxiety Scale was designed in 1952 as a measure of drive in the Hullian sense.

The work on learning started with the experiments of Ebbinghaus in which the emphasis was on the acquisition and retention of serial associations. An important alternative has been posed by the Gestalt position which holds that learning and memory are governed by some principles of organization as are manifested in the laws of perceptual grouping. Von Restorff (1933) supported Gestalt by describing isolation effect though this became later on a matter of theoretical controversy. The interest in this phenomenon was revived with the theory of serial learning developed by Jensen (1962), Jensen and Rowher (1965) and the information processing model of serial learning developed by Feigenbaum and Simon (1962). The stimulus-response theorists gave Gibson's generalization-differentiation hypothesis to account for Von Restorff effect but could not succeed. "Jensen's hypothesis remains an important alternative to S-R theories of serial position effects and Von Restorff effects but it requires considerably more empirical support."¹

The investigator has conducted an empirical study of Von Restorff effect on a much larger sample than the ones used in earlier studies. The purpose of the present study was to study anxiety, background meaningfulness and isolation effects in serial verbal learning.

A. Anxiety

Though anxiety has a long past but it was only in the late thirties that it was included in the indices of psychological books. Since this term has been used by various investigators in different ways, its meaning kept on changing from time to time. [The investigator has given definitions of anxiety as given by different psychologists.]

Taylor's (1953) MAS which was the first tool for measuring anxiety is still widely used. Measures of autonomic nervous system has also been

*Thesis submitted to Nagpur University (1975).

¹D. H. Kausler. *Psychology of Verbal Learning and Memory*. New York: Academic Press, 1974, p. 288.

used for measuring physiological component of A-state but studies conducted by McGuigan, *et al.* (1959), Sarason (1960), etc. have suggested that there is no correlation between psychometric and physiological measures of anxiety. Some self-report measures and checklists have also been constructed. Two relatively new measures of anxiety are the Profile of Mood States (POMS) (McNair, Lorr and Droppleman, 1971) and the State-Trait Anxiety Inventory (Spielberger, Gorsuch and Lushene, 1970). The investigator believes that people differ in anxiety proneness, therefore, a comprehensive theory of anxiety must include anxiety as a personality trait.

B. Meaningfulness

The psychologists have not reached the common definition of meaningfulness. Meaningfulness is not a new thing for psychologists. Ebbinghaus has already done much work on the meaningfulness of the learning materials. When Glaze said, "the following experiment was conducted for the purpose of testing the association value of what is commonly known as nonsense syllables",² a long-awaited operational base for the definition and measurement of meaningfulness was found. It should be made clear at this point that meaning and meaningfulness are not the same thing. In the words of Nobel : "Meaning is a relation between terms, let us define the meaningfulness of this situation as the number of its subsisting between S and the several R's taken together. More specifically, the particular meanings of S are : H₁, H₂, H₃....H_n, and different conceptual combinations of these H's yield different numbers of meanings."³

There are two methods for measuring meaningfulness : (i) the subject-defined method—it is a variation of the normative method by which psychometric tests are standardized, and (ii) the material-defined method, i.e. to collect a representative sample of textual material and then proceed to count the frequency with which each element appears in that sample. [The investigator has elaborately reviewed the literature on (i) anxiety and serial verbal learning, and (ii) isolation effects in serial verbal learning.]

Hypotheses

The following eight hypotheses were framed for the purpose of the present study :

²J. A. Glaze. The association value of nonsense syllables, *Journal of Genetic Psychology*, 1928, p. 255.

³C. E. Nobel. An analysis of meaning, *Psychol. Rev.*, 1952, p. 422.

1. The isolation effect changes the bowness and the skewness of the serial position curve.
2. The isolated item will occur more frequently as a correct response than will a non-isolated item occupying the same serial position.
3. The isolated lists are not facilitated in learning than the non-isolated lists, i.e. the total errors during learning and the total trials to learn the isolated and the non-isolated lists do not differ statistically.
4. Isolation effects do not locate merely at the isolated item but they spread to the non-isolated items.
5. The overall performance of low anxious subjects will be superior to that of high anxious subjects in the serial learning task.
6. The performance of high anxious subjects will be superior to that of low anxious subjects throughout learning the easy items in serial list (items 1, 2, 3 and 12). The performance of low anxious subjects for difficult items (7, 8, 9, 10 and 11) will be superior to that of high anxious subjects.
7. The isolation effects will be more pronounced against the low background meaningfulness.
8. The high anxious subjects will be more prone to omission errors (no response) while the low anxious subjects will show proportionately more transposition errors (items from within the list but misplaced) or extra-list items.

Sample

The sample of the present study consists of 120 high anxious and 120 low anxious subjects selected on the basis of the scores on Sinha's W.A. analysis form in Hindi which is a measure of anxiety as a trait. These subjects were students of University of Nagpur, Poona, Marathwada and Shivaji.

Method

Two measures of meaningfulness, viz. the association value and the related m have been adopted to choose the items of the list of nonsense syllables and the list of meaningful words, respectively. The isolation of the seventh item in the list of twelve items has been manipulated by only two methods: (I) the additional operation, and (II) the direct manipulation. All the 240 subjects were engaged in the classical serial learning experiment. In this the method of anticipation was used with two seconds' inter-item interval regulated on the memory drum and six seconds' inter-

trial interval. The serial learning experiment was carried out to one errorless reproduction. The $2 \times 2 \times 3$ factorial design was used with two levels of anxiety, two levels of meaningfulness and three levels of isolation. Twenty subjects were randomly assigned to each treatment.

The results obtained have been discussed in the light of Taylor-Spence and Mandler-Sarason theories of anxiety and the Jenson's theory of anchor points.

Findings

1. The low-anxious subjects were better in performance in the serial learning task as compared to high anxious subjects when the learning of the list of nonsense syllables (different task) was involved. Both the groups of subjects were on par in learning the list of meaningful words. Initially the performance of these groups was almost similar but from the fifth item onwards, LA group learned the successive items of the list more efficiently than the HA group.

2. The learning of the isolated item was facilitated and the isolation effect was more pronounced in the list of nonsense syllables. The isolation effect did not locate itself merely at that (isolated) item but the spread of effect was seen in the preceding item and very rarely in the following item.

3. The learning of the isolated list was also facilitated as compared to the non-isolated (control) list. This finding is typical as compared to the finding of the earlier studies done on the normal population. Though the isolated item was facilitated in learning, the learning of the remaining items was comparatively inhibited in the isolated list and, therefore, the total list learning did not show any advantage in the case of normal population. This is the first study of this type where isolation effect is studied in the high and low anxious subjects and hence subsequent research in this area may be able to throw light on this.

4. The classical shape of the serial position curves was altered by the isolated item. The curves showed a sharp fall at the seventh position (isolated) in the series in the experimental condition.

5. The high and low anxious groups differed in their performance when it was plotted in terms of mean absolute errors as a function of the serial position. The difference in the performance of these two groups obscured when it was plotted in terms of mean percentage of total errors. Similarly, when performance as a function of the serial position was plotted by the latter (per cent of total errors) method in the learning of the list of nonsense syllables and of the meaningful words, the serial learning curves did not differ. The McGary Hunter hypothesis was found to be valid for

anxious population and held for different types of material used in the present study.

6. The HA and LA subjects did not differ for the various types of errors in serial learning, viz the omission, transposition and the extra-list intrusion errors. However, the occurrence of the transposition and the extra-list intrusion errors was a function of meaningfulness of the list, the former (errors) being more in the list of meaningful words while the latter were more in the list of nonsense syllables.

7. The sex difference did not have any effect on the performance of the subjects in the serial learning task.

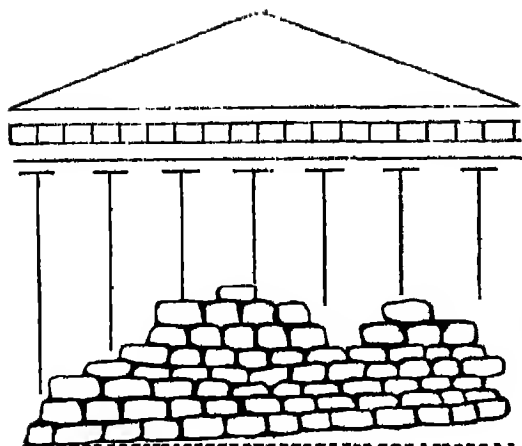
8. The isolation by material technique used in the second experimental condition (pm) has yielded some suprising findings. The effects of isolation and meaningfulness might have interacted in this condition. Further research is, therefore, needed to separate the effects of these two variables in studying the Von-Restorff isolation phenomenon with all its properties.

9. Since the study of isolation effects in serial verbal learning is perhaps the only one of its kind with the high and low anxious subjects, the investigator feels that a follow-up may be done with additional or different personality variables like rigidity, need achievement or security-insecurity to have a cross-comparison with the anxiety variables.

Conclusion

The isolation effect in serial verbal learning and some of its properties are accounted for in this study by the macro-processing model of the information processing theory. One of the postulates of this theory is the anchor points which explained the facilitation in learning of isolated item against the remaining items in the list. The Iowa and the Yale theories of anxiety have provided explanations for the differential performance of HA and LA subjects in the serial learning of the lists of different levels of meaningfulness.

[Abstract prepared by NEERJA SHUKLA, D]



Research Notes

Understanding of Science among NSTS Awardees, Teachers and Non-selected NSTS Students

An Investigation

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SCIENCE EDUCATION, after completing two phases (product-oriented and process-oriented) is entering in its third phase, laying emphasis on "the process and products of science as they are important to the person and society". The third phase also lays emphasis on the understanding of the nature of science. Many science curricular materials do not give required importance to the understanding of the nature of science. Ramsey and Howe (1969) mention :

The whole area of understanding the nature of science is enigmatic. It is easy to define when measured by gains in a particular test, but what this really means in terms of generalized understanding of science and what the implications are to a teacher, do not seem to be fully clear. It is an area in need of increasing attention from researchers.

In the USA and Australia significant studies have been conducted to measure students' and teachers' understanding of the nature of science. Saraswat and Sood (1972) while analysing the research on understanding of the nature of science, have recorded that so far there are only three studies conducted in India. There is sufficient scope to attempt research in this area to bridge the research gaps. The majority of the researchers have used the Test on Understanding Science (Tous) Form 'W' (1964) developed by Cooley and Klopfer. Some researchers have used Wisconsin Inventory of Science Processes—WISP (1968) by Pella and Welch, and others have used Nature of Science Scale—NOSS (1968) by Kimball.

There is hardly any study which has determined the understanding of the nature of science among the National Science Talent Search (NSTS) awardees and its comparison with the science teachers or the non-selected NSTS students.

In this study an attempt has been made to compare three different groups of students and teachers. The study was worded as :

An Investigation into the understanding of the nature of science among the National Science Talent Search awardees, science teachers, and the non-selected NSTS students.

The Sample

The subjects used in this study were divided into three major groups. First group consists of those students who were studying in the final year of the multipurpose higher secondary schools. These students took the NSTS examination but were not finally selected. The students were from the different schools of Rajasthan and Delhi. These students had more than 55 per cent marks in Class X.

The second group comprised the NSTS awardees. These students were from all over the country, studying in different universities and institutions recognized by the NSTS scheme sponsoring agency. This group of students had high science interest, high achievement in science and high motivational involvement with science, which was evident from the fact that they were NSTS scholarship awardees and were continuing their studies in basic sciences.

The third group comprised science teachers working in the schools of Rajasthan, Delhi, Uttar Pradesh, Punjab, Haryana, Himachal Pradesh, and J&K. These science teachers possessed either the Master's degree or Bachelor's degree in one science subject, and the Bachelor's degree in education with minimum of six years' teaching experience.

The Instrument

There are only three instruments available to measure the understanding of the nature of science. Among these, there is the Test on Understanding Science (Tous), developed at the Harvard University Graduate School of Education by Cooley and Klopfer. Form 'W' of this test was used in this

Table 1
DISTRIBUTION OF THE SAMPLE

<i>Groups</i>	<i>N</i>	<i>Percentage of the Sample</i>
Non-selected NSTS Students	200	40
NSTS Scholarship Awardees	100	20
Science Teachers from Different Schools of Seven States	200	40
Total	500	100

study after certain changes. The tous was developed as a result of considerable pre-testing and consists of 60 multiple-choice items with four alternatives per item and yields three sub-scale scores as well as a total score. The three sub-areas covered by the tous were :

Area I—Understandings about scientific enterprise

Area II—Understandings about scientists

Area III—Understandings about the methods and aims of science

The tous Form 'W' has been widely used in many studies throughout the world, to measure the understanding of the nature of science, and in the evaluation of science curricula. The reliability for the American population is 0.76. In Indian conditions this test was administered on a large sample and with the help of split-half method. The reliability was found to be 0.750.

The entire 60 items of tous were scored on a single key to give a score which reflects a general understanding of science and scientists. In this case a stencil scoring-key was used. Multiple-choice responses to an item were scored separately. The total score was taken as the final score. The χ^2 -test was applied to each one of the mean test scores. The analysis of variance was also applied.

UNDERSTANDING OF SCIENCE AMONG NSTS AWARDEES

Hypotheses

Null hypotheses to be tested were :

1. There was no relationship between NSTS awardees and non-selected NSTS students in the understanding of the nature of science.
2. There was no difference between NSTS awardees and science teachers in the understanding of the nature of science.
3. There was no difference between non-selected NSTS students and science teachers in the understanding of the nature of science.

Analysis of the Response of the Total Sample

In order to investigate whether science students and science teachers possess adequate understanding of the nature of science, the responses of the total population were analysed. The results are given in Table 2.

Table 2
MEAN AND SD OF THE TOTAL SAMPLE

Group	N	Mean	SD
Total Sample	500	30.08	8.34

Table 2 shows that the mean score of the total sample was 30.08 and SD 8.34. The mean indicates that the position of the sample in the understanding of the nature of science is favourable as compared by the theoretical mean on the TOS.

Analysis of the Responses of the NSTS Awardees and Non-Selected NSTS Students

The difference between NSTS awardees and the non-selected students in the understanding of the nature of science was tested by computing the significance of difference between mean scores by using *t*-test. Table 3 shows the results.

The mean score of the NSTS awardees was much higher than that of

Table 3

SUMMARY OF MEAN AND SD OF NSTS AWARDEES AND
NON-SELECTED NSTS STUDENTS

Group	N	Mean	SD	t	Significance
NSTS Awardees	100	37.20	6.00	10.20	Significant at 0.01 level
Non-Selected NSTS Students	200	28.88	8.52		
df.	298				

the non-selected NSTS students. When the difference between the means was tested for significance, we had a *t*-ratio of 10.20 which is higher than 1.96 or even 2.59, the value of .05 or 0.01 level of significance. Therefore, the difference in means is, obviously, highly significant.

The NSTS awardees were the most talented students in science as measured by the science-aptitude scale given by the NSTS scheme sponsors. They were the national scholarship holders and were attending the best institutions or universities. They have attended science summer institutes organized by the NCERT. In summer institutes they were exposed to the higher level processes and concepts of science. They came in contact with the professional scientists of high repute. The NCERT and the UGC have distributed suitable literature to them for reading. Perhaps, these factors helped them to understand the nature of science properly and adequately. There was another possibility. Since these students were studying in higher classes and were much more experienced and mature than their counterparts, they reflected better understanding of the nature of science as measured on TOS.

The Nature of the Responses of the NSTS Awardees and Science Teachers from the Different Schools of Seven States

The difference between NSTS awardees and science teachers from different schools of seven states, in the understanding of the nature of science was tested by computing the significance of difference between mean scores by using *t*-test of significance (Table 4).

UNDERSTANDING OF SCIENCE AMONG NSTS AWARDEES

Table 4

SUMMARY OF MEAN AND SD OF NSTS AWARDEES AND SCIENCE TEACHERS FROM DIFFERENT SCHOOLS OF SEVEN STATES

Group	N	Mean	SD	t	Significance
NSTS Awardees	100	37.20	6.00	12.40	Significant at 0.01 level
Science Teachers from Different Schools of Seven States	200	27.72	7.15		
df.	298				

Discussion

The mean score of the NSTS awardees is much higher than that of the science teachers, as is apparent from Table 4. When the difference between the means is tested for significance, we get a *t*-ratio of 12.40 which is much higher than 1.96 or 2.59. Therefore, the difference in means is very highly significant. Schmidt (1968) conducted a study and recorded that a "sizeable group of teachers had less understanding of science than their students". Thus, the present study is not an exceptional case.

These findings reveal typical things. Though science teachers possess higher educational qualifications and are much more experienced and mature than NSTS awardees, yet their understanding of the nature of science is much lower than that of the NSTS awardees. The possible reasons may be :

1. Science teachers do not try to keep abreast of the latest trends and developments in their subject area.
2. They were not exposed to similar experience as their counterparts, NSTS awardees, were.
3. Science teachers never thought of or studied something as the nature of science. They were not conscious about such an aspect as the nature of science. All their learning and teaching was based upon the facts of science.

The Analysis of the Responses of the Science Teachers from Different Schools of Seven States and

The difference between the science teachers and non-selected NSTS

students in the understanding of the nature of science was tested by computing the significance of difference between mean scores by using *t*-test of significance.

Table 5
SUMMARY OF MEAN AND SD OF SCIENCE TEACHERS AND
NON-SELECTED NSTS STUDENTS

Group	N	Mean	SD	<i>t</i>	Significance
Science Teachers	200	27.72	7.15	1.5	Not significant
Non-selected NSTS Students	200	28.88	8.52		
df.	398				

Discussion

The mean score of the non-selected NSTS students was higher than that of the science teachers of different schools of seven states. When the difference between the mean is tested for significance by using the *t*-test, we get a *t*-ratio of 1.58, which is less than 1.59. Therefore, the difference in means is due to chance factor only. Hence, there is no significant difference between the non-selected NSTS students and science teachers.

The students in this group were those who secured more than 55 per cent marks at Class X level. All students took NSTS examination but were not selected. The science teachers were also adequately qualified. But they, too, do not possess better understanding of the nature of science, in comparison to students; both were at par in their understanding.

Analysis of Variance

The analysis of variance was applied to determine whether the three groups differ significantly in their mean levels of understanding of the nature of science. Summary of the analysis followed by the tests of differences is presented below.

Table 6
SUMMARY : ANALYSIS OF VARIANCE OF THREE GROUPS

Sources of Variation	df	ss	MS (Variance)	F-ratio
Between Groups	2	6471.0	3235.5	57.06
Within Groups	497	28182.3	56.7	
Total	499	34653.3	Significant at .01 level	

From Table F
for $df_1 = 2, df_2 = 497$
F.01 = 4.65
F.05 = 3.01

Tests of Differences

- (A) Between M_1 and M_2 ($N_1 = N_2 = 200$)
 for $df = 497$, $t_{.01} = 2.59$ $SE_d = 7.43 \sqrt{\frac{1}{200} + \frac{1}{200}}$
 $1.05 = 1.96$
- $D_{.01} = 2.59 \times 7.53 = 1.95$
 $D_{.05} = 1.96 \times 7.53 = 1.47$
 $D_{1.2} = M_1 - M_2 = 1.16$
- (B) Between M_1 and M_3 , M_2 and M_3 ($N_1 = N_2 = 200$, $N_3 = 100$)
 $D_{.01} = 2.59 \times .90 = 2.33$ $SE_d = 7.33 \sqrt{\frac{1}{200} + \frac{1}{200}}$
 $D_{.05} = 1.96 \times .90 = 1.76$
 $D_{1.2} = M_1 - M_3 = 8.32$
 $D_{2.2} = M_2 - M_3 = 9.48$

It is evident from the foregoing analysis, that the three groups are not random samples drawn from the same normally distributed population, since the F-test refutes the null hypothesis at .01 level of significance. The actual F-ratio (57.06) is rather so large as compared with the desired F .01 (4.65) that it is a probability that group mean difference exceeds the experimental error of individual variation.

Further, the *t*-tests of differences indicate that the science teacher group and non-selected NETS candidates do not differ significantly. Differences became highly significant, much high above .01 level, when either of these two groups stands in comparison to the NETS awardees group.

Some Common Deficiencies in Understanding of the Nature of Science

There were ten items which gained low scores, attempted correctly by less than 25 per cent students and science teachers. Individuals have to choose the one best answer from each of the four alternatives in each item. The response pattern for the item identifies the groups of students and teachers, conceptions about science, and indicates areas for corrective learning-teaching.

A number of common deficiencies were revealed by a thorough study and detailed analysis of performance on the different items on TOS. These deficiencies were categorized under three different sub-areas as indicated on TOS.

Area I: Understandings about the Nature of Scientific Enterprise.

Science students and science teachers showed a lack of appreciation of :

1. The lack of creative endeavour in science (items 11, 18).
2. The dynamic, expanding and on-going nature of scientific enterprise (item 15).
3. The function of scientific journals (item 25).
4. The function of scientific societies (item 27).

Area II : Understandings about Scientists.

Common deficiencies, as reflected about scientists were :

1. Scientists spend every possible minute in the laboratory (item 32).
2. Scientists are born with a special scientific aptitude (item 42).
3. Scientists are serious and intelligent people (item 47).

Area III : Understandings about the methods and aims of science.
Individuals commonly exhibited a lack of appreciation of :

1. The role of theories and their relationships to research (item 50).
2. Distinctions between hypotheses, laws and theories (items 43, 48).
3. That science is not solely concerned with collection of facts (items 15, 50).

Main Findings and Implications for Science Teaching

The development of understanding of the nature of science is mainly the job of formal education. This study has given an indication of the current status of the students' and teachers' understanding of the nature of science. The results of this study revealed that the understanding of the nature of science was favourable among the total population studied, but when taken as sub-groups, they show some deficiencies concerning important issues of science. Surprisingly, this study has indicated poor understanding of the nature of science among science teachers in comparison to NSTS awardees. It has raised a very pertinent question : How far do teachers of science know the nature of science and how far do they know how to convey it to students ? Similar doubt was raised by Kimball (1968) while studying the understanding of the nature of science among scientists and science teachers. This study has revealed that :

1. The NSTS awardees had much more favourable understanding of the nature of science than the other groups included in this study.
2. The science teachers did not grow with time and experience

concerning their understanding and perception about scientists and the nature of science.

3. Many students and science teachers were in doubt about the role of scientists in society, the function of scientific societies and about the abilities of scientists.

In addition to these findings, it is apparent that science has lost favour as a subject of study among students in the country. While the enrolment figures vary in the universities in India, there is already a clear trend in the country that the lure of science and engineering is on the wane. The glamour of scholastic science courses in Delhi University is fast fading (*The Hindustan Times*, 14 Aug. 1973). Most significant documents on science education in India, e.g. *The Report of the Indian Parliamentary and the Scientific Committee*, 1963; *Science and Mathematics Education in Indian Schools : Report of the Unesco Planning Commission*, 1964; and *Mathematics and Science Education in Indian Schools*, 1965, agonizingly evaluated science education and recorded that the image of science teaching was not encouraging one and needs fundamental changes.

The NCERT has been focussing attention on the development of science textbooks, science kits, and other materials, which attempt to instil an understanding of science and the work of scientists. These textbooks are process-oriented and teachers are also using science kits, supplementary materials, and films. The NCERT has started programmes for the identification and nurture of talented students in science. All these efforts have initiated a change in the learning of science.

Conclusion

The findings based upon relevant data, reveal that there was significant difference between the NSTS awardees and non-selected NSTS students, in their understanding of the nature of science. Therefore, Hypothesis 1 was retained.

It was also revealed that there was significant difference between the NSTS awardees and science teachers, in their understanding of the nature of science. Therefore, Hypothesis 2 was rejected.

This study recorded that there was no significant difference between the non-selected NSTS students and science teachers in their understanding of the nature of science. Hence, Hypothesis 3 was retained.

This study has revealed many inadequacies on the part of the students and science teachers, concerning the learning of science. Similar inadequacies were determined among science teachers and science students (Sood,

1975; Ticher, 1967; and Mackay, 1971). It is essential that suitable corrective inservice programmes should be organized for science teachers and students.

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Examination and Employment

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NOW-A-DAYS there is hardly any other problem like the problem of examination in the field of education. There has been a long discussion over this issue at different levels of educated masses. Examinations held by any Board of Education or University are becoming more and more negatively polarized and we repeatedly hear the offensive incidents with the invigilators even under the police protection. Hence examinations have become a terror before the invigilators, examiners, paper-setters and even before the common students. Examiners are being terrorized and forced to award pass marks and sometimes first grade marks in practical examinations. Those who actually deserve, they suffer in this vicious set-up. Paper-setters are pressurized and sometimes forced for smuggling out the questions.

The above fact reveals that the real assessment of the examinee is not possible with this prevalent system of examination. The examinees have got a simple aim of either getting through or securing higher percentage of marks for using them as a means of better employment. Hence the examination is negatively attached with employment which is a curse. The problem, therefore, has two folds. First, the lack of real assessment through the present system of examination and second, a negative affiliation between examination and employment.

The first phase has been discussed in various situations. Bora (1973) pointed out two factors responsible for the present bitter situation. First, the issue is being criticized vehemently by all the people at all levels; second, the regional authorities are not taking steps according to the recommendations of various committees and commissions.

Kaul (1974) pointed out that in a seminar (1971) it was recommended about the improvement in the design of the question paper, introduction of semester system, mechanical scoring system, grade system of ranking, research in examination reforms, and assessment at various stages during a session, should all be a prerequisite to overpower this hard situation. This difficulty can also be overcome by improving objectivity, reliability,

validity and internal-external assessment. The reliability, validity may be improved according to Thorndike (1957) where he pointed out the test reliability and compensating errors. The degree of reliability-validity may be determined as expressed by Ahmann, (1965). Therefore, the first phase may be improved in view of the above facts.

The second phase needs exploration for solutions. Bhatnagar (1975) very wisely suggested a strategy of examination and employment. Rao (1966) pointed out about the problem of educated unemployment, and the concept of employment and manpower planning. His views bring a new thought of consideration with regard to examination and employment.

The employment training must be the part and parcel of the general education. Half-half schools at China, factory schools at Russia, industrial schools at Germany, workmanship of a student at Japan are evident that how they have linked their education with employment. The Kothari Commission has also suggested the introduction of work-experience along with general education.

Primary Education and Employment

Primary education is a preparatory stage. Right from this stage employment training along with general education is inevitable. Young kids are always found interested in play activities. Small jobs of handicrafts should be demonstrated before them. They should be encouraged and made interested for play jobs like paper-cutting, ceramics, art and painting, hand-made fans, brooms, cane articles, etc. Though at this level the students may or may not be able to produce any worthwhile article from the selling point of view, but their interest, aptitude, creativity, and dignity of labour aroused at this stage would help a lot in their future interest and personality make-up. Allport (1960) pointed out that "every personality develops continually from the stage of infancy. Early impressions are deeply rooted and they can be perceived in their future responses in life. Cyril Burt (1961) concluded that offensive personality may be prevented if cared properly at childhood, because empty mind is the devil's workshop. Gandhiji suggested basic education which we gave up without giving it a sound trial. It is now obvious that employment training at primary level is important from various points of views.

Upper Primary Education

Upper primary education is for the age-group 11-14. The employment training learnt at the primary level would give fruits at this stage. They would be able to produce worthwhile saleable articles. They would

help in mass hand-production of earthen pots, decorative pieces, hand-made fans and brooms, chalk-sticks, wax candles, cream, ink, leather articles, etc. Besides the production of articles, creating the sense of dignity of labour is more important. For such activities small mechanical powers can be used. The students in schools would be trained in these trades along with their general education. Daily assessment on the basis of work done in hand activities would be made and weekly tests in general education would also be indispensable. The students should be allowed to appear in final examination after completion of a fixed target of work activities and a prefixed percentage of marks obtained in general subjects during the whole session. Promotion to the next class would be subjected to the total marks obtained in internal and external assessments.

After Class VIII there would be an examination in practical and general subjects at district level and only those students securing a prefixed percentage of marks in this district level examination would be allowed for admission in higher secondary schools. Rest may be sent for a specialized hand-work training for two years in the same trade that they learnt during upper primary education. On successful completion of the two-year training the trained persons would be encouraged for establishing their own hand-work centres of workshop by providing them government loans and other facilities. Unsuccessful trainees would repeat the course at least for one year. The criterion for their success would be the completion of prefixed target of jobs.

In this system the examinee would not be bothered about the external examination because it would not be the criterion of his better employment. But they would be rather particular in developing the efficiency in trades and general subjects.

Higher Secondary Examination and Employment

The Secondary Education Commission (1952-53) suggested seven branches of education from Class IX. The students offering science, agriculture, home-science, technology, commerce and fine arts would go for their specialized education along with their general education in compulsory subjects. The students offering humanities would be placed in small machine-work activities for two hours daily along with their school subjects. There would be daily assessment on their practical work activities and weekly tests in school subjects. The eligibility for appearing in external examination would be on the basis of the completion of the prefixed practical work and marks obtained in weekly tests during the whole session. The total marks of internal and external assessment would be the criteria of success in that particular session.

After high school again there would be a test at state level. These tests would be conducted by Boards of Education in their respective states. There would be cooperation of the government to make these tests a success. The examinees securing a prefixed percentage at state level examination would be allowed admission in intermediate course and the rest would be split in two groups. One group, according to their aptitude test results, would be sent for a two-year special training in various industries and government bodies. Of course they would be placed in the same small machine training which they had learnt during high school period. The successful trainees would be encouraged for establishing their own industries by providing them government loans and other facilities. The unsuccessful trainees would repeat the machine trade course for at least one year. The second group having clerical aptitude would proceed for ministerial work, i. e. clerks, typists, accounts clerks, railway guards, ticket collectors, drivers and similar positions in roadways, teachers, nurses, post-office clerks, etc.

Intermediate Examinations and Employment

As pointed out earlier that only the deserving students on merit would be allowed admission in intermediate course. The students of their respective seven branches of education at their high school level would now receive further specialization in their trades. The procedure as in high school would be adopted at this stage too, for their assessment and further promotion. After completion of the intermediate course, again, there would be a state level examination conducted by the Boards of Education of their respective states with the assistance of the government. Possibly these examinations would be during summers and the numbers of centres would be reduced as much as possible in order to facilitate an overall control.

Now the Boards of Education of every state would function as a external body of examination for testing the students for further education and employment. The examination procedure would be adopted as suggested by the seminar organized by the Inter-University Board of India, New Delhi. Only those examinees who secure a prefixed percentage would be admitted for higher education in universities and colleges. The rest would be bifurcated again. One group having mechanical aptitude further, would go for master's training course for a period of four years in various trades in different private and government sectors. After successful completion of this training, they would be masters of different trades, i.e. master of tailoring, master of wood-work, metal work, leather-work,

weaving and designing, dyeing and printing, editing, composing, etc. Planning of these trades would be on similar lines as engineering and medical education. The second group which do not have mechanical aptitude would be given employment as clerks, typists, marketing and health inspectors, police inspectors navy and army personnel. Therefore, after the intermediate course there would be four years' master's training for everybody except ministerial workers. These trained personnel would become specialists for imparting training to others. They would also go for research work in their respective fields.

Concluding the above discussion, the author suggests the following improvements :

1. The system of examination should be changed by improving the design of question paper, introducing semester system, mechanical devices in scoring, grade system of ranking, improvement in teaching, research on examination reforms, and assessment at different stages during the session.
2. Examination results of schools and colleges should not form the basis of employment, but a separate competitive examination at the state level should be arranged for various employments within the state.
3. The government must create more and more employment opportunities like the following :
 - (i) Lower class jobs and hand-work facilities should be offered after Class VIII.
 - (ii) Middle class jobs and small power facilities should be given after higher secondary education.
 - (iii) Upper middle class jobs and power industry facilities should be offered after intermediate.
 - (iv) Grade I posts should be offered to trained and qualified persons.
4. Research on examination reforms and employment opportunities should be encouraged at the state and the national level.

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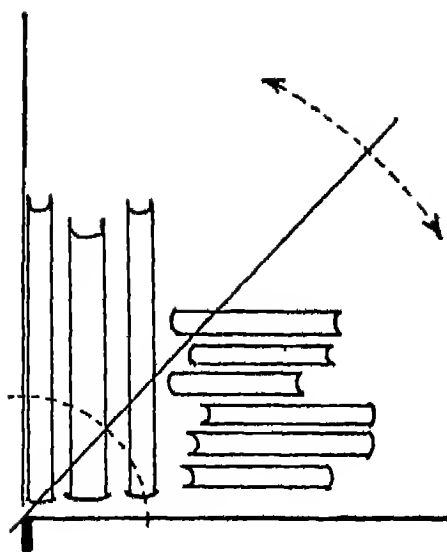
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Book Reviews

Projecting Educational Growth

Educational System of India—An Econometric Study. Dr. Shri Prakash.
Concept Publishing Co., Delhi, 1977, pp. 269, Price : Rs. 42.00 (\$ 9.00)

ECONOMICS OF EDUCATION as a university discipline has assumed significance during the last two decades or so, although stray references to this subject could be traced back to the classical economists. The pioneering work on the quantification of the economic value of education was done by T.W. Schultz about three decades ago. Since then, however, the subject has increasingly engaged the attention of economists and a number of studies have been undertaken, particularly in the United States and the United Kingdom on the various aspects of this subject. The study under review is one of the few documents produced on the subject in India.

The study, which is the revised and enlarged version of the author's doctoral thesis, seeks to examine the "interactions of the developing Indian economy, in a dynamic setting and its educational sector in a state of flux". The study also evaluates the systematic influence exercised by the demographic and economic factors—population growth and its age-structure, earnings, employment probabilities, parental income and occupation, student's abilities and growth of national income—upon the educational variables. One would have wished that the author

had somewhat delimited the scope of the study, so that he could have done ample justice to the various aspects of the investigation.

The author discusses the various approaches to educational planning. He particularly examines the rate of returns to investment in education approach and criticizes it on various counts including the assumption implicit in this approach that the age-education-earning profiles, from which the social rate of return is calculated, will remain constant throughout the period of reference. The changes in the production techniques make the law of constant returns inoperative both in the developed and developing economies. He also doubts the validity of the hypothesis that earnings reflected productivities.

About the manpower approach, the assumptions are that the future structure of labour force can be estimated from the projected growth and structure of the gross output or final demand. It is also assumed that the educational system can be adapted to bring about the requisite changes in the labour supply. Further, that the long lead time is required to provide facilities in plant and personnel for training the manpower, the future obsolescence is thus assumed away. It is also difficult to foresee the new technological developments and their implications.

One would agree with the author's enunciation of the limitations inherent in forecasting the manpower needs. It is, however, difficult to reject the technique out of hand unless other methodologies prove to be more scientific and realistic.

The author discusses the mathematical models of projecting educational requirements. In particular, he analyses the Tinbergen-Correa model, which examines the balanced growth paths of educational system on the assumptions similar to those that fit the models of capital goods. According to the author, the difficulty with this model is that it takes a constant rate of retirement. Further, the constant labour coefficient neglects capital substitution for labour and one type of labour by another.

About Stones' model, the author is of the view that it is a multi-sector input-output model of education, wherein educational system is taken as a chain of inter-dependent processes. Here the number of students enrolled in any year is shown as a function of future vectors of graduate leavers. This model is also limited in that it does not distinguish between current account and capacity variables, though the flow equation of students is analogous to an open dynamic input-output model. Further, the sequential aspect of educational policies are not incorporated in this model.

The author's substantive contribution is the development of two econometric models for projecting the demand for education in India for 1975 and 1980. He has used the 'age specific model' in three alternative ways : trend

analysis of the enrolment possibilities, regression of enrolment probabilities on real per capita income and the regression of the number of students of the various age-groups on the real per capita income of population of the given age-groups. The other model that he has used is 'iterative model', under which the number of students enrolled in a class are derived from the number of students enrolled in lower classes in the preceding year or through the transition coefficients. The author seems to prefer the iterative model because it projects the demand on the regression of the transition coefficients on income and time rather than the projections based on parabolic time-trend.

The utility of developing appropriate econometric models for projecting future expansion of Indian education cannot be denied. The results emerging from these models are vitiated to a certain extent because the various stages of education, particularly the elementary stage, have a sizeable proportion of under-age and over-age students (in some classes, it is as high as 40 per cent). It is expected that with the extension of facilities to the hitherto inaccessible areas and population groups, this phenomenon will be reduced in size. To base the projections solely on the current enrolment data is likely to give faulty results. The author's assumptions about the growth of national income and per capita income are also subject to question.

The author has devoted a chapter to the review and preview of Indian education. He has made pointed reference to the astronomical growth of enrolment in technical and professional education, in spite of which the imbalance between the growth of general and technical education has been accentuated. He has inferred that while the development of facilities for general education outstripped the growth of its demand, the growth of facilities for technical education could not keep pace with the growth of demand for it. Although it is very difficult to estimate the 'demand' for general education or technical education in precise terms, one would not agree to the inference drawn by the author. Here also, we have been faced with the problem of the supply outstripping the demand, which has been recognized by the author when he says: "Even the technically and professionally qualified persons, especially engineering graduates, have to face the problem of unemployment".

The author has also referred to the outlays provided in the draft Fifth Plan and their likely implications for the enrolment targets in respect of various age-groups, availability of teachers, and institutional facilities. He has come to the conclusion that if the allocation for education in the Fifth Plan is not increased substantially, either the social demand for education will not be met or the standards will be lowered. Notwith-

standing the fact that the allocation for education of Rs. 1726 crores made in the draft Fifth Plan was subsequently reduced to Rs. 1285 crores (the actual expenditure may be still less), it is difficult to vouchsafe the authenticity of the enrolment targets mentioned in the book. For example, it has been stated that with the proposed allocation of Rs. 743 crores for primary education, "provision for admitting 4.52 crores students into primary stage would be made each year as against 5.56 crores and 7.02 crore students who would be seeking admission in 1975 and 1980". It may be recalled that in draft Fifth Plan, the additional targets of enrolment during the five-year period (1973-74 to 1978-79) at the primary stage was 1.45 crores, which would mean a year-wise enrolment of about 29 lakhs, and not 4.52 crores as assumed by the author. Similar remarks apply to the targets for the secondary stage also. Obviously, the enrolment data necessitate a substantial revision !

The conclusion that can be drawn is that futurology, in spite of its obvious fascination for the researchers, is an extremely difficult pastime. It is more so in the field of education, which is subject to diverse influences exercised by economic, sociological and psychological factors. Moreover, the limitations of data exercise severe constraints on the authenticity of the findings.

It is also hazardous to rely on a single set of statistical techniques, however sophisticated it might be, to arrive at realistic projections of educational development. The conclusions need to be counter-checked through a series of statistical formulations in order to reduce, if not eliminate altogether, the effects of the imponderables that exercise significant and continuing influence on the development of a sociological phenomenon, like education.

Nevertheless, the study makes a painstaking analysis of some of the current econometric models for making educational projections and attempts to develop multi-sectoral models to analyse the working of Indian education. The book is well documented and the bibliographical references have been laboriously arranged. The study is expected to stimulate further work on this difficult aspect of Indian education and, therefore, deserves all encouragement. It will be particularly useful to educational planners and those concerned with manpower projections as also researchers in this branch of study. A useful addition to the rather scanty literature on this subject !

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Education and Colonialism

Education and Colonialism. Philip G. Altbach and Gail P. Kelly.
Longmans, 19 West 44th Street, New York, 10036, 1978, pp. 372,
Price : \$ 6.95 (paperback).

UNTIL THE SECOND WORLD WAR it had more or less been accepted that colonialism was the ultimate stage of social-political development and that it had come to stay. Few could have imagined that 'the wind of change' was around the corner. Even when the reins of power were handed over to the colonies they had doubts about their competence to rule. So much indoctrination on these lines had gone on for almost ages that the brain-washed colonial people looked up to their erstwhile masters to furnish them with models of good governments. This is so human that Winston Churchill recalled a parallel in his book *The Island Race* : the misery of the English populace at the time of Roman withdrawal. The Roman withdrawal had been voluntary and the English people apparently did not have any alternative political set-up to take over administration. The modern-day colonies, except in very few cases, had, however, to wage bitter fights in order to win their positions and yet they seldom fail to look back on their colonizers for approval and appreciation of acts reminiscent of their colonial past. Repeated references to the British practices in the proceedings of Indian Parliament and State legislatures should bear us out. Indeed, the slavish manner in which the Indian intellectuals continue to look upon Britain for giving them theoretical models of work that they make themselves look absolutely ludicrous, considering that Great Britain is nowhere near being an intellectual or political leader in the contemporary world.

It is about time serious studies were made into the nature of colonialism and its influences on all facets of human institutions including education as a sub-system. The nature of political governments among the colonizers gave their colonies a corresponding system of political and educational set-up. This is a fruitful area in which Altbach and Kelly have entered. Their hope is : "This book will stimulate further research and analysis". We also hope that it will.

The theoretical framework has been outlined in the introduction of the book. The school system of colonies emerges as a result of the needs of colonizers. Both missionaries and administrators played their own roles in this matter. Alienation of the educated with their own people was characteristic of this educational provision. The provision was patterned on the metropolis (i.e. London) aimed at producing urban elite. The authors have emphasized that the two systems (i.e. of the colonies and the colonizers)

were different in content as well as quality. For example, whereas France gave her colonies a centralized administration, England did not do so. The medium of instruction was also decided by the fact 'who ruled whom'. The school curriculum "represented a basic denial of the colonized's past and withheld from them the tools to regain future." A whole range of reactions to schools was evident starting from welcome to complete rejection or hostility. In turn, these reactions were dependent on their own motivations. In brief, the nature and quality of the provision of schools was dependent on the colonizers and not the colonies. Against this framework, the authors have examined seven systems excluding the USA under the sub-section 'internal colonialism'. This in itself is a completely novel nature of study although references to its existence are universally made. For example, the way the poor and the scheduled castes are treated in India could lend itself to a revealing study. There is one fear, however, in such a case the study would never be objective. To this extent the American society is free from fear. They have, therefore, explored the process of "usurpation and replacement." Internal colonialism implies the absorption of the colony into one-nation state, controlled by the colonizer. Studies of American, Peruvian, Indians, etc reveal the operation of this principle rather boldly. Similarly, the Blacks, women and the working class constitute the weaker sections in that society. They have also been paid attention.

A section has also been devoted to the problem of "neo-colonialism". It has been a favourite pasture in India and perhaps because of his association with this country, Altbach has chosen to include it. The entire 'Third World' suffers from this malady, it could be so called. How to free oneself from the hang-over of the colonial past or pre-independence institutions is a serious problem. None has been able to do so completely, perhaps neither they ever will or *should*. These institutions have served their purpose and only with time would they outline their utility.

It is interesting to note that both the theorists have abstracted the principle in this relationship as 'inequalities.'

Before we come to the specificities of this model as applied to educational systems we must note here that there is no 'ideal' system of education anywhere in existence. The system which serves the purpose of any society at any given point of time is 'ideal'. Therefore, to read any system outside this context whether to judge for its 'inequality', 'nepotism,' or elitism, etc. is both dangerous and wrong. This is precisely what we always do. Societies evolve and throw up models for their own survival. Struggles within the society show merely that the system is alive and adjustable, or else in placid waters of dead societies nothing ever moves. This internal

movement or adjustment is dependent on the vocal sections of society including political, religious and other types of intelligentsia. The greater the turmoil the higher are the chances of its internal adjustment.

The first study by Aparna Basu on India is really not a very thoughtful piece of research. It is a rehash of known facts and a summary of what might be regarded as couple of secondary sources. The reason why this study merits this rather critical comment is that she has shown understanding of the indigenous elites and their motivations including the learning traditions among castes like the Brahmins, the Kayasthas and the Banias or the Maulvis and the Parsis or the Christians. Certain castes have to maintain their primacy in society either because they have no property or have to undertake such jobs which force them to read. The rate of literacy in India during the time of the British was around 11 per cent because the 'learning traditions' among certain castes had remained a major motivating factor. This rate is now going up because newer communities are acquiring this motivation. A certain element of liberalization of attitudes toward women has contributed to it. These are called first generational learners. This factor alone is sufficient to explain why India remains until this day a very backward society in terms of education. Besides, it has very little to do with what the British did to us. Similarly, industrialization, urbanization, democratization of membership to the existing institutions were other factors which enabled literacy figures to go up. Gandhiji gave a call for an alternative system of education—self-sufficient in itself and also independent of the government fold, purely for political and social purposes of mass-awakening. This failed not because it was in any sense bad but the classes for whom it was meant were not much interested in its provision. The author has merely touched upon a few factors enlisted here but none either in depth or sweep.

The present volume contains other studies which may interest educated Indians, particularly the ones put under the sub-section 'internal colonialism'. A few studies in this area on India would be very welcome indeed. An excellent book on a topic which invites more research and greater involvement on the part of Indian scholars.

R. P. SINGH □

(Contd. from Cover II)

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